


SAILING DIRECTIONS
FOR THE
CANADIAN SHORES OF LAKE ONTARIO
1921



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3 for a Lock

2 for a Bridge

1 for a Tye up

SAILING DIRECTIONS

FOR

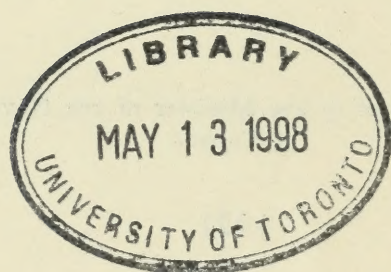
CANADIAN SHORES OF
LAKE ONTARIO

Published by Order of the Minister of the Naval Service
of Canada

1921

Obtained on payment of 50 cents from the Department of the
Naval Service

OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1921



ADVERTISEMENT

The following directions written by Mr. G. A. Bachand, Assistant Hydrographer, of the Hydrographic Survey, Department of Naval Service, in 1921, under the orders of the Government of the Dominion of Canada, form the first edition of Sailing Directions of the Canadian shores of lake Ontario. They describe the lake and its shores from the entrance to Kingston harbour to the Niagara river, as will be seen by the order of the chapters.

The information contained therein is compiled from information obtained during the progress of the survey, from portions of the United States Lake Survey charts of the districts affected, from Notices to Mariners, and from information gathered from various sources.

The charts issued by the Hydrographic Survey of Canada may be purchased at a uniform price of 25 cents each from the Hydrographic Office, Department of Naval Service, Ottawa; the Agents of the Department of Marine and Fisheries at Montreal and Parry Sound; the Superintendent of the Canadian Soo Canal, Sault Ste. Marie, Ont., and to a limited extent from the Collectors of Customs at Port McNicoll, Fort William, and Port Arthur.

For a detailed description of the lighthouses and light buoys between Quebec and Montreal, see the "List of lights and fog signals on the Atlantic coast," and for those west of Montreal, see "List of lights and fog signals on the Inland waters," both works published annually by the Department of Marine, from whom they may be obtained free of charge.

Seamen are requested to transmit to this office any errors or omissions they may notice in this work.

These Sailing Directions are issued to the public at 50 cents per copy.

These Sailing Directions should not be used without reference to the Notices to Mariners affecting lake Ontario and issued since this work went to press.

W. J. Stewart,
Chief Hydrographer.

HYDROGRAPHIC OFFICE,
DEPARTMENT OF NAVAL SERVICE,
OTTAWA, September, 1921.

THE
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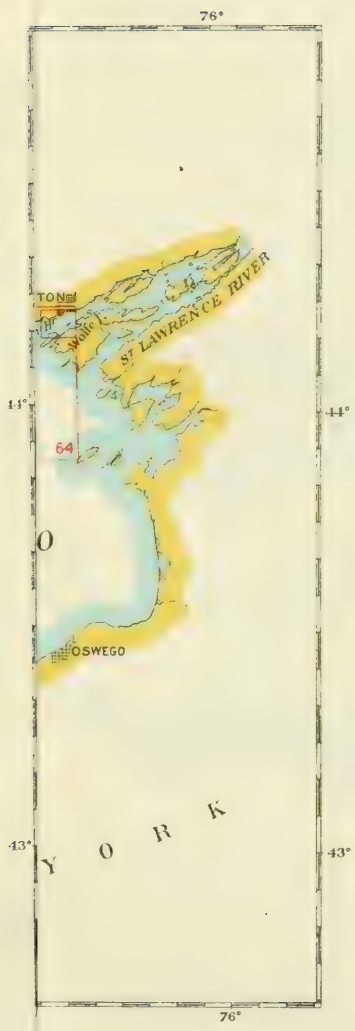
In this work, the bearings are magnetic.

The Variation, or Déclination, given at the foot of the pages, is brought up to the year 1921 by applying the annual change to the latest determination.

The distances are expressed in nautical miles, "seven" of which are approximately equivalent to "eight" statute miles. The fractional parts of miles in short distances are expressed by decimals, for example: 0.87 miles = $8\frac{7}{10}$ cables, or, if for office use, $0.87 \times 6,077 = 5,287$ feet.

The datum to which the soundings are reduced, except for bay of Quinte, is that of standard low water, adopted by the United States and Canada for the Great Lakes. This is elevation 243.0 above mean tide New York and is 3.2 below the mean level of the lake for the last sixty years or 5.95 feet below the high water of May, 1870.

The datum for the bay of Quinte Chart No. 69 is 245.0.



80°

79°

78°

77°

76°

INDEX TO

CANADIAN HYDROGRAPHIC SURVEY CHARTS

ALLUDED TO IN THIS WORK

* indicates that a plan is given upon the coast chart which is shown to embrace it

65 indicates that a plan of the place is given upon sheet number 65

A number against a place shows that a separate plan is published

Areas enclosed within thus — are covered by charts now being prepared



LIST OF CHARTS COVERING THIS VOLUME

PUBLISHED BY THE CANADIAN HYDROGRAPHIC
OFFICE

Price 25 cents each

TITLE

- 59. Kingston Harbour.
- 60. Main Duck island to Presqu'île bay.
- 61. Presqu'île bay to Port Darlington.
- 62. Newcastle Harbour to Toronto.
- 63. Toronto to Niagara river.
- 64. Kingston to False Ducks.
- 65. Toronto harbour.
- 66. Approaches to Niagara river.
- 67. Burlington bay (Hamilton harbour).
- 69. Deseronto to Presqu'île.
 - Telegraph narrows.
 - Nigger narrows.
 - Belleville harbour.
- 70. Plans of harbours.
 - Port Whitby.
 - Cobourg harbour.
 - Port Hope.
 - Frenchman bay.
 - Port Credit.
 - Port Dalhousie.
- 71. Presqu'île bay.
- 73. Plans of harbours.
 - Port Darlington.
 - Bronte harbour.
 - Oakville harbour.
 - Newcastle harbour.
- 77. General chart of lake Ontario.

PUBLISHED BY THE UNITED STATES LAKE SURVEY

TITLE OR LOCALITY

- 21. Wolfe island to Stony point and Pleasant point.
- 22. Stony point to Little Sodus bay, N.Y., Oswego, N.Y.
- 23. Little Sodus bay to Charlotte, N.Y.
- 24. Charlotte to Thirty Mile point, N.Y.
- 25. Thirty Mile point, N.Y., to five miles west of Port Dalhousie.
Ont.

227. Little Sodus bay, N.Y.
 234. Great Sodus bay, N.Y.
 241. Charlotte harbour, N.Y.
 256. Lower Niagara river.

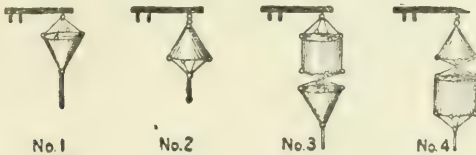
Most of the courses and bearings in this volume are given in degrees: and, for the convenience of mariners whose compass cards are divided only into points, the following table of equivalents is appended:—

Points.	° /	Points.	° /	Points.	° /
North.....	0 0	N.N.E. $\frac{3}{4}$ E....	30 56	N.E. by E. $\frac{1}{2}$ E.	61 52
N. $\frac{1}{8}$ E.....	1 24	N.N.E. $\frac{7}{8}$ E....	32 20	N.E. by E. $\frac{5}{8}$ E.	63 17
N. $\frac{1}{4}$ E.....	2 49	N.E. by N.....	33 45	N.E. by E. $\frac{3}{4}$ E.	64 41
N. $\frac{3}{8}$ E.....	4 13	N.E. $\frac{7}{8}$ N.....	35 09	N.E. by E. $\frac{1}{8}$ E.	66 05
N. $\frac{1}{2}$ E.....	5 37	N.E. $\frac{3}{4}$ N.....	36 34	E.N.E.....	67 30
N. $\frac{5}{8}$ E.....	7 02	N.E. $\frac{5}{8}$ N.....	37 58	E. by N. $\frac{7}{8}$ N. .	68 54
N. $\frac{3}{4}$ E.....	8 26	N.E. $\frac{1}{2}$ N.....	39 22	E. by N. $\frac{3}{4}$ N. .	70 19
N. $\frac{7}{8}$ E.....	9 50	N.E. $\frac{3}{8}$ N.....	40 47	E. by N. $\frac{5}{8}$ N...	71 43
N. by E.....	11 15	N.E. $\frac{1}{4}$ N.....	42 11	E. by N. $\frac{1}{2}$ N...	73 07
N. by E. $\frac{1}{8}$ E..	12 39	N.E. $\frac{1}{8}$ N.....	43 35	E. by N. $\frac{3}{8}$ N...	74 32
N. by E. $\frac{1}{4}$ E..	14 04	N.E.....	45 00	E. by N. $\frac{1}{4}$ N...	75 56
N. by E. $\frac{3}{8}$ E..	15 28	N.E. $\frac{1}{8}$ E.....	46 24	E. by N. $\frac{1}{8}$ N...	77 20
N. by E. $\frac{1}{2}$ E..	16 52	N.E. $\frac{1}{4}$ E.....	47 49	E. by N.....	78 45
N. by E. $\frac{5}{8}$ E..	18 17	N.E. $\frac{3}{8}$ E.....	49 13	E. $\frac{7}{8}$ N.....	80 09
N. by E. $\frac{3}{4}$ E..	19 41	N.E. $\frac{1}{2}$ E.....	50 37	E. $\frac{3}{4}$ N.....	81 34
N. by E. $\frac{7}{8}$ E..	21 05	N.E. $\frac{5}{8}$ E.....	52 02	E. $\frac{5}{8}$ N.....	82 58
N.N.E.....	22 30	N.E. $\frac{3}{4}$ E.....	53 26	E. $\frac{1}{2}$ N.....	84 22
N.N.E. $\frac{1}{8}$ E....	23 55	N.E. $\frac{7}{8}$ E.....	54 50	E. $\frac{3}{8}$ N.....	85 47
N.N.E. $\frac{1}{4}$ E....	25 19	N.E. by E.....	56 15	E. $\frac{1}{4}$ N.....	87 11
N.N.E. $\frac{3}{8}$ E....	26 43	N.E. by E. $\frac{1}{8}$ E.	57 39	E. $\frac{1}{8}$ N.....	88 35
N.N.E. $\frac{1}{2}$ E....	28 07	N.E. by E. $\frac{1}{4}$ E.	59 04	East.....	90 00
N.N.E. $\frac{5}{8}$ E....	29 32	N.E. by E. $\frac{3}{8}$ E.	60 29		

Similarly with the other quadrants.

STORM SIGNALS.—The Canadian signals are made by means of cone and drum, as follows:—

DAY SIGNALS



No. 1.—A cone, apex down, indicates the probability of a gale; at first, from an easterly direction.

No. 2.—A cone, apex up, the probability of a gale; at first, from a westerly direction.

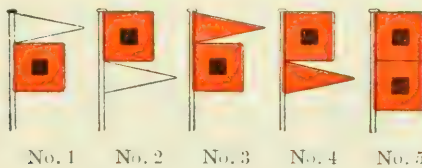
No. 3.—A cylinder over a cone, apex down, indicates the probability of a heavy gale; at first, from an easterly direction.

No. 4.—A cone, apex up, over a cylinder, the probability of a heavy gale; at first, from a westerly direction.

The **night** signal corresponding to Nos. 1 and 3 is a **red** light; that, corresponding to Nos. 2 and 4, is a **red** light over a **white** light.

The **United States** signals are made with pendants and square red flags, as follows:—

DAY SIGNALS



Small craft warning.—A red pendant indicates moderately strong winds that will interfere with safe operation of small craft; no **night** display. Violent storms are indicated by day signals comprising a square red flag with black centre, and either a red or white pendant, and by **night**, signals composed of lanterns either red, or red and white; the colour and position of the pendants or lights showing the initial direction of the wind, as follows:—

No. 1.—Northwest storm, white pendant above square flag; or white lantern above red lantern.

No. 2.—Southwest storm, white pendant below square flag; or white lantern below red lantern.

No. 3.—Northeast storm, red pendant above square flag; or two red lanterns one above the other.

No. 4.—Southeast storm, red pendant below square flag; or one red lantern.

No. 5.—Hurricane warning, two square flags, one above the other, or two red lanterns with white lantern between, indicate an extremely severe or dangerous storm.

BUOYAGE SYSTEM.—The Canadian and United States Governments adopt, in the essential features, the same system of buoyage.

In proceeding up the St. Lawrence, or into the harbours of either country, the buoys on the **starboard** hand are painted red and, when numbered, have even numbers. Those on the **port** hand are painted black, and marked with odd numbers.

Buoys marking middle grounds are painted with black and red horizontal bands, and are passed on either hand. Those painted with black and white vertical stripes are placed in mid channel, and must be passed close-to to avoid danger.

All **starboard** hand spar buoys, maintained by the Government of the Dominion of Canada, have pointed tops; and all **port** hand spar buoys have flat tops.

Being liable to displacement, the position of buoys should not be implicitly relied upon. (*See* also, below).

All Canadian lights in the St. Lawrence river are kept in operation as long as navigation is open. Buoys will be placed in the spring, as soon, and be kept in their positions as long, as the ice permits. If the gas buoys are removed before the close of navigation, spar buoys, as markers, will be established, when possible. It must be remembered that gas buoys are unwatched, and, if extinguished, some time may elapse before they can be relighted. They cannot be depended on, therefore, in the same way as watched lighthouses.

CAUTION.—Damaging floating lights.—Masters of vessels who injure, alter, or make fast to any aid to navigation, render themselves liable to a fine of two hundred dollars (200.00). Any master of

a vessel who, through unavoidable accident, has displaced any aid to navigation, must give notice of the same to the nearest customs officer, or will be liable to a fine of fifty dollars (\$50.00).

MAGNETIC DISTURBANCE has been found to exist at several places along the shores as well as on lake Ontario itself. Observations made at and near Kingston, Ont., by Major J. B. Cochrane, Assistant Director of Military Surveys, Department of Militia and Defence, then professor at the Royal Military College, Kingston, show (see chart No. 59) that over a considerable area the compass variation varies from 16° E. to 30° W. The observations were made during the months of March and April of 1894 and 1895 with a solar compass.

In 1913 magnetic observations were made by the United States Lake Survey, employing standard compass, magnetometer and special outfit for the work, and traversing the entire lake with lines of observation connecting ports along either shore and crossing on various courses between United States and Canadian ports.

Over lake Ontario the compass variation does not change uniformly in going east or west, and there are many spots of wide departure from the normal variation, i.e., the value predominating in the surrounding region. Some places worthy of special mention are noted below.

About 10 miles N.N.W. from Olcott, N.Y., in a distance of 4 miles extending from southwest to northeast, the variation ranges from a minimum of 0° to a maximum of 16° W., the normal for this region being about 7° W. The existence of this irregularity of variation is of interest and concern to navigation because of its outlying position over deep water, on or near the path of vessels proceeding to and from Welland canal and Niagara river entrance.

At Port Hope, Ont., a small area close to the shore has a variation of 11° W., the normal for that vicinity being from 7° to 8° W. In mid-lake, about 20 miles S. by E. of Port Hope, a small locality evidenced a variation of 13° W. with 8° W. around it. Close to the shore, along the lake side of Prince Edward county, Ont., from west of Peter point to Prince Edward point, minor irregularities were found, running from 6° W. to 14° W.

At the southerly entrance of St. Lawrence river, at a point $1\frac{1}{2}$ miles west of Tibbetts point lighthouse, the variation is 17° W., while at a point on the vessel course 6 miles to the south-southwest

it is only 7° W., and at a point 6 miles down the St. Lawrence river, it is 11° W. About 2 miles to the northward of East Charity shoal gas buoy, at a point 3 miles from Pigeon island lighthouse on a line thence to Tibbetts point lighthouse, the variation of but 1° W. occurs.

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SAILING DIRECTIONS
FOR
CANADIAN SHORES OF LAKE ONTARIO
AND BAY OF QUINTE

CHAPTER I

**FROM KINGSTON AND TIBBETTS POINT TO THE PASSAGE
BETWEEN THE DUCKS AND GALLOO ISLAND AND THE
PASSAGE BETWEEN THE DUCKS AND FALSE DUCKS
ISLANDS.**

Note.—For the descriptions of the east end of lake Ontario, which are omitted herein, see the “*St. LAWRENCE PILOT, ABOVE QUEBEC,*” Canadian edition, year 1920.

A **bank**, isolated, 7 miles in length and 2 to $2\frac{1}{2}$ miles in width, with a mixed character of bottom having less than 10 fathoms of water upon it, spreads northeast and southwest, southward of Amherst island, with deep water between it and the island.

Big Bar shoal is a narrow patch $1\frac{3}{4}$ miles long northeast and southwest under the depth of 30 feet, lying on the southwestern end of the above mentioned bank. The shoalest water, 7 feet over rock, is upon the southwestern portion of the patch, bearing $N. 81^{\circ} W.$, and distant $7\frac{3}{4}$ miles from Pigeon island lighthouse.

Another **shoal**, one-quarter of a mile in diameter under the depth of 30 feet, lies on the northeastern end of the above mentioned bank. It has a least depth of $23\frac{1}{2}$ feet of water upon it, over hard bottom, bearing $N. 54^{\circ} W.$, distant 5 miles from Pigeon island lighthouse.

PIGEON ISLAND.—LIGHT.—This small island, in Canadian waters, lies $S. 7^{\circ} W.$, distant a little over 5 miles from Ninemile

point lighthouse on Simcoe island. It is situated on the middle of a small bank which, under the depth of 30 feet, is $1\frac{1}{2}$ miles long and 550 yards wide. On it, in addition to the white dwelling-house, is erected a white skeleton structure, from which, at a height of 65 feet above the lake, a *group flashing white* light is exhibited, visible in clear weather from a distance of 13 miles. The light shows thus: flash, *two-tenths of a second*; eclipse, *eight-tenths of a second*; flash, *two-tenths of a second*; eclipse, *three and eight-tenths of a second*.

Shoal water extends in a northeasterly direction one-half mile, at which distance there is a depth of $7\frac{1}{2}$ feet with the 5-fathom line rounding it about 75 yards farther out. A flat, with 12 to 13 feet water upon it, makes out southwestward from the island for a distance of one-third of a mile, the 5-fathom line rounding it one-third of a mile farther out.

Fog signal.—A hand horn answers signals from passing vessels.

A shoal, small in extent, with 23 feet of water upon it, over hard bottom, lies S. 39° W., distant $4\frac{1}{4}$ miles from Pigeon island lighthouse, with deep water on all sides.

CHARITY SHOAL, in Canadian waters, with less than one foot of water over it, is one of the three dangerous rocky reefs lying 3 miles southeastward of Pigeon island.

Buoy.—A black can buoy is moored in 4 fathoms, on the northwest side of Charity shoal, bearing S. 45° E., and distant 2.6 miles from Pigeon island lighthouse.

South Charity shoal, in Canadian waters, is a narrow patch nearly one mile in length northeast and southwest, lying half a mile southward of Charity shoal, to which it is connected by a ridge having a greatest depth of 30 feet upon it. The shoalest water, $10\frac{1}{2}$ feet, is over the northeastern portion of the patch, bearing S. 35° E., and distant 3 miles from Pigeon island lighthouse.

EAST CHARITY SHOAL, on the international boundary, has $7\frac{1}{2}$ feet least water on it. It lies one-half mile southeast of Charity shoal, to which it is connected by a ridge having a greatest depth of 18 feet upon it.

Chap. I.]

Gas buoy.—A red conical gas buoy, No. 2, showing an *occulting white* light, the light lasting *ten seconds*, and the darkness *ten seconds*, is moored in 20 feet of water on the south end of East Charity shoal, bearing S. 44° E., and distant 3.5 miles from Pigeon island lighthouse.

A red bell buoy, sounded by the action of the waves, is moored close alongside the above gas buoy.

Caution.—Vessels should not pass between the last two mentioned buoys and the black can buoy marking the northwest side of Charity shoal.

TIBBETTS POINT, in the state of New York, is situated 2½ miles southwest of Cape Vincent harbour, the park-like coast between, 60 feet high, being nearly straight and steep to. This, the south entrance point of the southern or main channel of the St. Lawrence river, is composed of dark brown rock, and its tall lighthouse, when the sun is set on it, is conspicuous from the lake.

LIGHT.—On the extreme of Tibbetts point is erected a white conical tower, 59 feet high, from which, at a height of 69 feet above the lake, is exhibited a *fixed white* light, visible, in clear weather, from a distance of 13 miles.

Fog signal.—At Tibbetts point lighthouse, a steam whistle, in thick or foggy weather, is sounded thus: blast, *three seconds*; silent interval, *seventeen seconds*; blast, *three seconds*; silent interval, *thirty-seven seconds*.

Shoal.—A narrow bank runs out in a southwesterly direction from Tibbetts point, nearly one mile. On it is a depth of 17 feet bearing S. 71° W., and distant three-quarters of a mile from the lighthouse. On the northwest side, the 5-fathom line approaches to within 375 yards of the latter depth.

Grenadier island, 3 miles southward of Tibbetts point, is 2 miles long northeast and southwest, 1½ miles in breadth and thickly wooded. Shallow spits extend three-quarters of a mile from its southwest extremity, and nearly half a mile from its south side. The 5-fathom line rounds the southwestern part of the island, 1½ miles off, southwestward.

GALLOO ISLAND, in United States waters, is $3\frac{2}{3}$ miles in length northeast and southwest, and one mile in breadth. A shallow flat extends out southwestward from the southwestern end of the island. On it, one-quarter of a mile out, there is a depth of 3 feet. On the northwest side of the southwestern portion of the island, the 5-fathom line is close in; it rounds the southwest point two-thirds of a mile off, thence trending southeastward, rounds a small shoal, with $22\frac{1}{2}$ feet of water on it, lying S. 50° E., and distant $1\frac{1}{4}$ miles from the lighthouse on the southwest point. The northeast part of the island has shallow water extending from it, one-third of a mile.

LIGHT.—On the southwest extremity of Galloo island is erected a grey conical tower, from which is shown, at a height of 58 feet above the lake, a *fixed white* light, visible 13 miles in clear weather. The light bears S. 12° E., and is distant $11\frac{2}{3}$ miles from Pigeon island lighthouse.

Fog signal.—In thick or foggy weather a steam whistle sounds blasts of *four seconds* duration, with intervals of *twenty-six* seconds between each blast.

Galloo shoal, isolated, is an ugly danger with 2 feet least water on it. It is $1\frac{1}{2}$ miles long northeast and southwest, and 775 yards in breadth, under the depth of 30 feet. The shoalest water is situated on the southeast side of the northeast part of the shoal, bearing N. 48° W., and distant one mile from Galloo island lighthouse.

Gas buoy.—A black conical gas buoy, No. 3, is moored in 4 fathoms, 560 yards westward of the shoalest part of Galloo shoal, exhibiting an *occulting white* light, the light lasting *ten seconds*, and the darkness *ten seconds*. The buoy bears N. 85° W., and is distant 1.3 miles from Galloo island lighthouse.

An obstruction, which is supposed to be the spar of a wreck, was lying, in 1914, N. 25° W., distant 0.8 of a mile from Galloo island lighthouse. It was then in depths of 70 to 80 feet, with 15 feet water over it.

A shoal, isolated, with $6\frac{1}{2}$ feet least water upon it, lies half a mile northward of **North pond**, a shallow indentation in the north

Chap. I.]

side of Galloo island situated a little more than a mile west of its northeast extremity.

THE DUCKS ISLANDS are two in number, both in Canadian waters, the western being known as Main Duck island, and the eastern as Yorkshire island. They lie E. by S. $\frac{1}{2}$ S., about 7 miles from False Ducks islands lighthouse, and midway between these islands and Galloo island.

The passage between the Ducks islands and Galloo shoal, being $5\frac{1}{2}$ miles broad, has depths varying from 6 to 30 fathoms.

Main Duck island is nearly 2 miles in length northwest and southeast. The northwest portion, 22 feet high, has a greatest breadth of two-thirds of a mile, and is heavily wooded. The summit of the island is about 300 yards S.E. by S. from the lighthouse on the west point. The remaining portion is narrow, low, swampy at places and sparsely wooded. On the south side of the island, which is fringed with broken rock and outlying boulders, and from which shoals under 6 feet extend one-third of a mile, the shore bank grades down slowly in a southwesterly direction.

On the bearing W. by S. $\frac{1}{2}$ S., from the lighthouse on the west point of the island, the 18-foot line is one mile off, and the 30-foot line, $1\frac{3}{4}$ miles. One-quarter of a mile northward of this bearing and running parallel to it, the northern side of the bank is steep to, the soundings increasing, in a few yards, from the depth of 30 feet to that of 60. Southeastward of the same bearing, the 5-fathom line converges slightly towards the south shore of the island for a distance of $3\frac{1}{4}$ miles, thence, making a fairly abrupt turn, runs northeastward towards the northeast point of Yorkshire island, which it approaches to within 400 yards.

The northern coast of the island is steep to.

LIGHT.—On the west extremity of Main Duck island is erected a white octagonal concrete tower, which, at a height of 74 feet above the lake, exhibits a *flashing white* light every *six seconds*, visible, in clear weather, a distance of 14 miles. The light bears S. 36° W., and is distant 9.0 miles from Pigeon island light.

Fog signal.—In thick or foggy weather, a diaphone sounds 2 blasts of *three seconds* duration, with an interval of *three seconds*

between them, followed by a period of silence of *thirty-six seconds* duration.

Yorkshire island is half a mile in length and 300 yards in width, and thickly wooded. It lies half a mile eastward of the east point of Main Duck island, being connected thereto by shoal water which extends southward, one-third of a mile. Shoal water extends north-east from the northeast point of the island, the 5-fathom line rounding the same, one-third of a mile off.

Anchorage, in 9 to 10 fathoms, will be found northward of the middle portion of Main Duck island, affording good shelter in southerly winds.

PRINCE EDWARD POINT, the southeastern projection of Prince Edward county, is fairly low. From the offing it appears to be covered with trees.

A bank, with a mixed character of bottom having less than 10 fathoms of water upon it, and on which are situated William, Harris, and Psyche shoals, connects Prince Edward point to the False Ducks islands. It also extends southeastward, leaving a passage $1\frac{1}{4}$ miles in breadth between it and the bank, under the same depth, which spreads out southwestward of The Ducks islands.

A cove runs in immediately northward of the lighthouse on the east extreme of Prince Edward point. It is about 100 yards in width, and affords shelter for small craft not drawing more than 4 feet.

LIGHT.—A white square tower, with dwelling attached, is erected on the east extreme of the southern part of Prince Edward point, and, at the height of 36 feet above the lake, exhibits a *fixed red* light, visible 7 miles. The light bears S. 87° W., and is distant 2.7 miles from False Ducks islands lighthouse.

FALSE DUCKS ISLANDS are two in number, the eastern being known as Swetman island and the western as Timber island. There is deep water between the two islands, but each is joined to Prince Edward point by shoal water. (See False Ducks bank, page 21). On the northern and the eastern sides of Swetman island the water is deep close in.

Chap. I.]

LIGHT.—On the east point of **Swetman island**, a low, pear-shaped, nearly treeless island, two-thirds of a mile long east and west, is erected a white circular stone tower, from which, at a height of 68 feet above the lake, a *fixed white* light is exhibited, visible in clear weather from a distance of 13 miles. The light bears N. 71° W., and is distant 7.0 miles from Main Duck island lighthouse.

Fog signal.—In thick or foggy weather, a diaphone sounds one blast of *four seconds* duration at intervals of *one minute*.

Timber island, of which the northeastern portion is thickly wooded, and the remainder in pasture, is three-quarters of a mile long northeast and southwest, and one-quarter of a mile wide. The water is deep on all but the southwest side, off which, one-third of a mile southwestward, there is a depth of $8\frac{1}{2}$ feet.

Anchorage is afforded in 6 to 9 fathoms of water between Timber and Swetman islands.

False Ducks bank is the name given to the shallow flats which connect Prince Edward point to Swetman and Timber islands. On it, shoals under the depth of 6 feet, including **Duckling reef** which is just awash, extend $1\frac{1}{2}$ miles west-southwestward from the southwest side of Swetman island, having a greatest breadth of two-thirds of a mile. The southeast side of False Ducks bank runs S.W., a distance of nearly 2 miles from the clean coast of the east point of Swetman island. On this bank there is also a depth of $7\frac{1}{2}$ feet, a little over half a mile N.E. by E. $\frac{1}{4}$ E. from the lighthouse on Prince Edward point.

A short distance eastward of Prince Edward point there is a narrow winding channel, with a least depth of 13 feet, leading into the bay of the same name (see page 26), but, as there are no clearing marks, it cannot be recommended to any one not well acquainted with the locality.

Traverse shoal or **False Ducks Outer shoal**, three-quarters of a mile in width east and west under the depth of 5 fathoms, is the southwestern extension of False Ducks bank. On it is a depth of $7\frac{1}{2}$ feet bearing S. 10° E., and distant $1\frac{1}{2}$ miles from Prince Edward point lighthouse. The south edge of the shoal also bears S. 49° W., and is distant $3\frac{1}{2}$ miles from False Ducks islands lighthouse. Between

the shoal and False Ducks bank there are depths of a little less than 5 fathoms.

Vessels should not attempt to pass north of this shoal.

William shoal, isolated, is a narrow rocky patch $1\frac{3}{4}$ miles long northeast and southwest under the depth of 30 feet. Its shoalest water, 12 feet, is on the northwest side of the middle portion of the patch, bearing S. 23° E., distant $1\frac{1}{4}$ miles from False Ducks islands lighthouse. The depths between William shoal and Swetman island and False Ducks bank range from 7 to 11 fathoms.

Harris shoal, isolated, has a least depth of 15 feet over it. Under the depth of 30 feet this rocky patch is a little over one mile in length east and west, almost joining William shoal, and is one-third of a mile in width. The shoalest water is on the edge of the eastern end of the shoal, bearing S. 58° E., distant $2\frac{1}{4}$ miles from False Ducks islands lighthouse.

Psyche shoal, rocky, isolated, small in extent, with deep water on all sides, although not quite so shallow as the last two mentioned dangers, there being 19 feet least water upon it, yet, as there are no clearing marks, and because it lies in the middle of the passage between the Ducks and the False Ducks islands, it becomes a danger of some importance on account of the possibility that vessels of heavy draught may touch it in a sea. It lies S. 56° E., distant $3\frac{1}{4}$ miles from False Ducks islands lighthouse, and N. 86° W., distant $3\frac{1}{2}$ miles from Main Duck island lighthouse.

The passage between Main Duck and Swetman islands with its outlying dangers just described having no clearing marks, should be approached with due caution.

In clear weather, vessels approaching this passage from northward, or from southward, especially if of heavy draught, should check their position with cross bearings to the lighthouses on Main Duck and Swetman islands. For instance, a vessel from Kingston, if proceeding as directed below, when $10\frac{1}{4}$ miles from the position abreast of Ninemile point lighthouse on Simeoe island, should have Main Duck island light over the port bow bearing S. by E. and Swetman island light bearing W. by S.

In thick or foggy weather, vessels approaching the above passage from westward or southward, except if of light draught, should

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not shoal to a less depth than 7 fathoms. Great care should be exercised when approaching it from northward, as the soundings give little or no indication of the outlying dangers, there being from 12 to 19 fathoms as close as one-third of a mile from them in that direction.

DIRECTIONS.—From Kingston to lake Ontario.—Proceed out on the line of Barriefield common range lights in one bearing N. 47° E., pass northward of Penitentiary gas red and black buoy, 61 T, and give the coast a berth until abreast of Portsmouth front range light. Then haul southward, bringing the range lights in line astern bearing N. 29° E. The range is kept on, passing between Melville shoal and Middle ground, until abreast of Ninemile point lighthouse on Simcoe island.

From this point steer S. 33° W., for a distance of $15\frac{1}{2}$ miles, passing $2\frac{1}{2}$ miles northwestward of Main Duck island, to a position from which the northeast point of Timber island touches the northeast side of Swetman island bearing N. 53° W. False Ducks islands lighthouse should then bear N. 54° W., and Main Duck island light-house N. 82° E., then proceed as desired.

The course and distance from this position to Oswego, New York, is S. 7° E., $28\frac{1}{2}$ miles (see below for alternative track); to Fairhaven, New York, S. 11° W., 34 miles; to Sodus, New York, S. 28° W., 40 miles; to Charlotte, New York, S. 56° W., $55\frac{1}{2}$ miles; to Niagara bar, S. 82° W., 110 miles, the latter course leading $2\frac{1}{2}$ miles southward of Peter point lighthouse, from which point vessels bound for Toronto may steer N. 87° W., 95 miles, to the eastern entrance of the harbour.

If proceeding from Kingston to Oswego, a vessel may, when abreast of Ninemile point lighthouse on Simcoe island, steer S. 11° W. (true South), for a distance of 5 miles to a position one mile westward of Pigeon island lighthouse, then steer S. 6° W., $36\frac{1}{2}$ miles, to Oswego. On the latter course a vessel will pass one mile eastward of Yorkshire island (Duck islands).

From Tibbetts point to lake Ontario.—From a position with Tibbetts point lighthouse bearing S. 79° E. (true East), distant $1\frac{1}{2}$ miles, the course and distance to Sodus, New York, is S. 38° W., $55\frac{3}{4}$ miles. If bound to Oswego, or to Fairhaven, from the position west of Tibbetts point, steer S. 31° W. for a distance of $13\frac{1}{2}$ miles,

United States chart No. 21 (See p. 7.)

Canadian charts Nos. 59, 60, 64 and 77.

Varn. 10° $30'$ W. (Magnetic disturbance, see p. 11.)

when Galloo island lighthouse should bear S. 79° E. (true East) distant 3 miles. Haul southward, now, and steer S. 11° W. for Oswego, distant 25 miles, or, S. 26° W. for Fairhaven, distant $33\frac{1}{4}$ miles.

If bound to the western part of lake Ontario, or to Charlotte, New York, a vessel may, from the position west of Tibbetts point, steer S. 38° W., for a distance of $14\frac{1}{2}$ miles, when Galloo island lighthouse should bear S. 79° E. (true East), distant $4\frac{3}{4}$ miles, from which point proceed as desired.

The course and distance to Charlotte, from this point, is S. 62° W. $58\frac{3}{4}$ miles; to Niagara bar, S. 83° W., 115 miles, the latter course leading $3\frac{1}{2}$ miles north of Olcott lighthouse. If bound to Toronto, from the position west of Galloo lighthouse, steer West, for a distance of 26 miles, when Peter point should bear North, distant $2\frac{1}{4}$ miles, then steer N. 87° W., 95 miles, to the eastern entrance of Toronto harbour.

If bound to the western part of lake Ontario, a vessel in daylight, with fine and clear weather, may, from the position west of Tibbetts point, steer S. 67° W., for $5\frac{1}{2}$ miles, when Charity shoal black can buoy should bear S.S.E. distant two-thirds of a mile. This course leads 600 yards southward of the shore bank running out from Bear point of Wolfe island, and 700 yards northward of Allen Otty shoal. From the position abreast the can buoy steer S. 57° W., for 11 miles, when Main Duck island lighthouse should bear N. 82° E., and False Ducks islands lighthouse N. 54° W., having passed $1\frac{1}{4}$ miles northwest of Main Duck island. From the latter position proceed as desired (see page 23).

Or, an alternative track, leading south of the Charity shoals and northwest of Main Duck island, may be taken. From the above position west of Tibbetts point lighthouse steer S. 43° W., with East Charity shoal gas buoy on the starboard bow for $5\frac{1}{2}$ miles, when that buoy should bear N.N.W. distant three-quarters of a mile. This course leads 900 yards southeast of Allen Otty shoal. From the position abreast the gas buoy steer S. 68° W. for 12 miles, when Main Duck island lighthouse should bear N. 82° E., and False Ducks islands lighthouse N. 54° W., having passed nearly three-quarters of a mile northwest of Main Duck island.

From lake Ontario to Kingston.—A vessel from westward, to run the passage between Main Duck island and Swetman island.

United States chart No. 21 (See p. 7.)

Canadian charts Nos. 59, 60, 64 and 77.

Varn. 10° $30'$ W. (Magnetic disturbance, see p. 11.)

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should steer with Main Duck island light bearing N. 82° E., till the northeast end of Timber island and the northeast side of Swetman island are seen in line bearing N. 53° W., or *at night*, until False Ducks islands light bears N. 54° W., then alter the course as desired.

From the above position, the course and distance, to a position on the Portsmouth range with Ninemile point lighthouse bearing S. 79° E. (true East) distant three-quarters of a mile, is N. 33° E., 15 miles.

The range N. 29° E. leads, between Melville shoal and Middle ground, into the North channel and should be kept on until within about half a mile of Carruthers point.

Being, now, well north of Snake island bank, a vessel should turn eastward, passing northward of Penitentiary shoal gas red and black buoy, 61 T, giving the shore a berth until Barriefield common range lights are in line bearing N. 47° E., on which marks proceed into Kingston harbour. To those well acquainted there is the old channel with depth of 14 feet, southeast of Snake island bank.

A vessel from Oswego, steering N. 6° E. from that port, should pass one mile east of Yorkshire island (Ducks islands). From this point steer the same course with Pigeon island lighthouse on the starboard bow for a distance of 8 miles, when the same light should bear S. 79° E. (true East) distant one mile, then steer N. 11° E. (true North), with Ninemile point lighthouse on the starboard bow. After running 5 miles, a vessel should be on the Portsmouth range and abreast of Ninemile point lighthouse, distant three-quarters of a mile whence proceed as before directed.

From lake Ontario to Tibbetts point.—From a position with Galloo island lighthouse bearing S. 79° E. (true East), distant 3 miles, the course and the distance, to a position with Tibbetts point lighthouse bearing true East distant $1\frac{1}{2}$ miles, is N. 31° E., $19\frac{1}{2}$ miles. This course leads $1\frac{1}{2}$ miles northwest of Galloo shoal gas buoy, No. 3, $1\frac{1}{2}$ miles southeast of East Charity shoal bell and gas buoys (see page 17), and three-quarters of a mile southeast of Allen Otty shoal.

If from the western part of the lake, a vessel in daylight, with fine and clear weather, may, from the position with Main Duck

island lighthouse bearing N. 82° E., and False Ducks islands lighthouse bearing N. 54° W., steer N. 68° E. for 12 miles, when East Charity shoal gas and bell buoys (see page 17) should bear N.N.W., distant three-quarters of a mile. This course leads nearly three-quarters of a mile northeast of Main Duck island. From the position abreast the gas and bell buoys steer N. 43° E., for $5\frac{1}{2}$ miles, when Tibbetts point lighthouse should bear S. 79° E. (true East), distant $1\frac{1}{2}$ miles.

Or, an alternative track, leading northward of the Charity shoals, may be taken. From the above position westward of Main Duck island, steer N. 57° E., for 11 miles, when Charity shoal can buoy should bear S.S.E., distant two-thirds of a mile. This course leads $1\frac{1}{4}$ miles northeast of Main Duck island. From the position abreast the can buoy steer N. 67° E., $5\frac{1}{2}$ miles, when Tibbetts point lighthouse should bear S. 79° E., distant $1\frac{1}{2}$ miles.

PRINCE EDWARD BAY is the large bight formed by the east coast of Prince Edward county between the point of the same name and Pleasant point.

Halfmoon point.—From the northeast end of Prince Edward point to Halfmoon point, 4 miles distant, the shore of Prince Edward bay trends westward for a distance of $3\frac{1}{2}$ miles. It then turns northeastward towards the latter point. This coast is fairly clean and steep to except for a small patch, with 19 feet of water upon it, lying E.S.E. distant half a mile from the latter point. Halfmoon point is clean and fairly steep to.

Flats point, 2 miles westward of Halfmoon point, has shallow water extending 325 yards eastward of its east side. The shore bank runs out two-thirds of a mile eastward and one-quarter of a mile northward of the point.

West of Flats point, the shore turns abruptly southward to form a shallow bay three-quarters of a mile wide and $1\frac{1}{4}$ miles long, in the bottom of which is situated the village of **South Bay**, and on the west side the village of **Port Milford**. The latter has several small wharves.

Waupoos island is situated on the north side of Prince Edward bay, $2\frac{1}{2}$ miles northward of Halfmoon point. It is $1\frac{3}{4}$ miles long

United States chart No. 21 (See p. 7.)

Canadian charts Nos. 60, 64 and 77.

Varn. $10^{\circ} 30' W.$ (Magnetic disturbance, see p. 11.)

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northeast and southwest and is partly wooded and partly cultivated.

The passage on the northwest side, separating the island from the main shore, has a least breadth of one-third of a mile with a least depth of $7\frac{1}{2}$ feet. A shallow flat runs out one-third of a mile northward of the northern side of the island.

Deep water approaches to within 300 yards of the south side of the island.

Waupoos wharves.—The passage on the west side of Waupoos island, having a least breadth of one-third of a mile with a least depth of 12 feet, leads to the two wharves of the village of Waupoos on the mainland. Both wharves are 100 feet long and 6 feet may be carried to their outer ends.

Green islet, low, very small in extent, is the apex of a reef consisting of gravel and boulders over rock, which, at high water, may be just awash. It lies S. 48° W. distant $1\frac{1}{4}$ miles from Cape Versey. Shoals under 6 feet extend one-quarter of a mile northeastward and southeastward, and half a mile southwestward from it. The west side of Green islet is connected with the main shore northward, and also with the east side of Waupoos island, by a bank of shoal water. The 10-fathom line approaches to within a little over one-third of a mile eastward of the islet.

Cape Versey, a conspicuous cliff with perpendicular face, rises abruptly from a steep-to shore to more than 150 feet above the lake. It bears N. 30° W., distant $6\frac{3}{4}$ miles from False Duck islands lighthouse, and S. 40° W., distant 5 miles from Pleasant point lighthouse.

From Cape Versey the shore trends northeastward, forming a double curve, 5 miles to Pleasant point. At the cape and also for a distance of one mile westward along the shore, the 10-fathom line is close in, but towards Pleasant point the shore bank varies between one-third and three-quarters of a mile in width.

Pleasant point is the northeast extremity of Prince Edward county; it separates Prince Edward bay from Adolphus reach of bay of Quinte.

Since the construction of the Murray canal, at the west end of Prince Edward county, bay of Quinte affords an alternative

route from Kingston to Presqu'île bay and lake Ontario, for vessels of not more than 9-foot draught. (See datum, p. 5).

LIGHT.—On the northeastern extremity of Pleasant point is erected a white octagonal wood tower, from which, at a height of 52 feet above the lake, is exhibited a *fixed white* light, visible 12 miles in clear weather.

Storm signals are exhibited from a mast erected near the south entrance of Prinver cove (see p. 81). This mast is visible only from the Adolphus reach side of Pleasant point.

Upper gap is the name given to the passage between Pleasant point and the west end of Amherst island (see "St. Lawrence Pilot, Above Quebec," 1920, page 220). It is $1\frac{3}{4}$ miles in width. Shoals under 18 feet extend half a mile northeastward and the same distance eastward from the lighthouse on Pleasant point. A small patch with 17 feet water over it lies N. 78° E. distant $1\frac{1}{4}$ miles from the same lighthouse. There is a deep channel between the latter shoal and the west side of Amherst island, but vessels passing mid-way between the island and Pleasant point will find 27 feet of water.

DIRECTIONS.—**From lake Ontario to bay of Quinte.**—A vessel from westward should steer with Main Duck island lighthouse bearing N. 82° E., and when Prince Edward point lighthouse bears N. 8° W., distant $3\frac{1}{2}$ miles, it may haul northward steering N. 40° E., with False Ducks islands lighthouse over the port bow. After running $4\frac{1}{4}$ miles the vessel should be abreast of and half a mile from the latter, having passed close to the deeper water of William shoal, but half a mile northwestward of its shallowest part (12 feet). Then rounding the lighthouse point of the island, steer North for a distance of 11 miles, passing in the middle of the Upper gap, or three-quarters of a mile eastward of Pleasant point lighthouse. When well out of the Upper gap haul southwestward, keeping in the middle of Adolphus reach (see page 81).

Or, a vessel may steer with Main Duck island lighthouse bearing N. 82° E. until the northeast point of Timber island is seen in line with the northeast side of Swetman island bearing N. 53° W., or at night until False Ducks islands light bears N. 54° W., thence steer N. 13° W. 14 miles for the middle of the Upper gap.

CHAPTER II

FROM FALSE DUCKS ISLANDS TO PRESQU'ILE BAY

The coast of Prince Edward county, from the point of the same name to Peter point, 14 miles westward, is low, swampy at places, and has no conspicuous features. The farmhouses are distant one to 2 miles from the lake shore and few of them are visible from the offing.

The slight indentations of the shore form points and bays of no importance. Most of the coast is bordered with shallow water, or rocky shoal flats covered with numerous boulders, extending out as much as three-quarters of a mile, making the landing difficult and dangerous. The shore bank, except near Peter point, is one to 14 miles in width.

Preston reef is rocky, covered with willows, lying 400 yards off shore, 4 miles westward of False Ducks islands lighthouse. Shoals under 6 feet extend half a mile southwestward of it.

Charwell point is the name given to a narrow sand and gravel bar, 2 to 3 feet in height, which projects out one-third of a mile southeastward, 3 miles eastward of Peter point. It is surrounded with rocky flats covered with numerous boulders, which, under the depth of 6 feet, extend out half a mile southward from the end of the bar.

PETER POINT.—LIGHT.—On the south extremity of this low and sparsely wooded point, which is the most southerly point of Prince Edward county, is erected a white circular stone tower, from which, at a height of 62 feet above the lake, is exhibited a *revolving white light*, every *thirty-five* seconds, visible from a distance of 13 miles in clear weather.

The lighthouse bears S. 77° W., and is distant 16.7 miles from False Ducks islands lighthouse.

Shoals under 6 feet extend southwestward one-quarter of a mile. The 5-fathom line rounds the point half a mile off.

Canadian charts Nos. 60, 64 and 77. (See p. 7.)
Varn 9° 30' W. (Magnetic disturbance, see p. 11).

Fog signal.—In thick or foggy weather, a diaphone sounds one blast of *three seconds* duration, every *thirty seconds*.

Peter bay.—From Peter point the shore turns abruptly northward, partly surmounted by rock cliffs 15 feet in height, forming the east shore of Peter bay. At one mile from the point it alters its character to that of a low gravelly and rocky beach partly strewn with boulders, gradually turning westward towards Wicked point, 4 miles westward.

Wicked point.—On the southwest extremity of this thickly wooded point, which separates Peter bay from Wicked bay, is erected a white square wooden tower, with dwelling attached, bearing N. 65° W. and distant 4.0 miles from Peter point lighthouse. No light is shown from this tower.

Wicked bank is the name given to a rocky spit which makes out $1\frac{1}{4}$ miles in a west-southwesterly direction from Wicked point. On this spit, shoals under the depth of 6 feet extend out two-thirds of a mile, and those under 18 feet $1\frac{3}{8}$ miles. The 5-fathom line, which from Peter point runs almost straight, rounds the latter 300 yards farther out.

Wicked bay, between the last described point and Owen point, is $2\frac{1}{2}$ miles wide and 2 miles deep. Off the outer portion of the southeast side of the bay the deep water is fairly close in. The bottom of the bay consists of a sand beach, affording good landing; the 5-fathom line approaches to within one mile of it. **Spence lake** empties into Wicked bay through the sand beach.

Anchorage, in 6 to 8 fathoms over sand, may be found in Wicked bay, affording good shelter in winds from north to southeast.

Owen point is the north entrance point of Wicked bay. It is situated $2\frac{1}{2}$ miles northwestward of Wicked point.

Wellington bay is the large open space lying between Owen and Nicholson points. It takes its name from the village of Wellington which is situated at the north bend of the bay 3 miles north-northwestward of Owen point.

The east side of the bay, being nearly straight, trends N. 27° W. It consists of a narrow strip of land, separating **Yoe lake** from lake Ontario, on the southern portion of which are sand dunes 45

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feet in height and sparsely covered with coniferous trees; the northern portion is low and sandy. There is a narrow and shallow opening in this sand bar near Wellington, leading into Yoe lake, which, however, is entirely closed up at times.

Shoals.—Two narrow patches of boulders extend southwestward from the east side of Wellington bay, at distances of $1\frac{1}{2}$ miles and $2\frac{1}{2}$ miles from Wellington, respectively; the former has 15 feet of water upon it two-thirds of a mile out, and the latter has 13 feet on it nearly one mile out.

The 5-fathom line rounds these two shoals $1\frac{1}{2}$ miles out.

Wellington, in Prince Edward county, is situated close to the shore at the north bend of the bay of the same name. In 1921 it had a population of 830. A tall pine tree, about one mile northwestward of the village, shows up conspicuously, being seen from a considerable distance seaward. At one time Wellington was a shipping port for grain, but its wharves have fallen into decay. It is a station on the branch line of the Canadian National railways which runs between Picton (11 statute miles eastward) on bay of Quinte, and Trenton junction, $19\frac{1}{2}$ statute miles northwestward by rail. At the latter point, connection is made with the main lines of the Canadian Pacific and the Canadian National railways between Montreal, Kingston and Toronto.

From Wellington to **Nicholson point** $6\frac{1}{2}$ miles westward, the shore forms a slight outward curve, with a shore bank less than half a mile in width. This coast has no other conspicuous features than a few farmhouses and barns, some of which are situated close to the shore.

SCOTCH BONNET ISLAND.—LIGHT.—On this small, flat and bare island, 7 feet in height, is erected a white circular tower with dwelling attached, from which, at a height of 51 feet above the lake, is exhibited an *occulting white* light during *one second* every *four seconds*, visible from a distance of 12 miles in clear weather. The lighthouse bears S 36° E., and is distant 8.25 miles from Presqu'île point lighthouse and N. 71° W. $13\frac{1}{4}$ miles from Wicked point.

Shoals under 6 feet extend one-quarter of a mile southeastward with deep water a short distance off. The 5-fathom line rounds the

east side of the island half a mile eastward. On the north and also on the west side the deep water is close in.

The passage between Scotch Bonnet island and Nicholson island is nearly one mile in width and has depths of 7 to 11 fathoms.

Scotch Bonnet shoal, with a least depth of 14 feet upon it, is one mile long east and west and half a mile in width under the depth of 5 fathoms. The shoalest spot bears S. 17° W., and is distant 2 miles from Scotch Bonnet island lighthouse.

The west end of Nicholson island in line with Scotch Bonnet island lighthouse leads 300 yards westward of the above shoal.

Palen bank, rocky, small in extent, has 24 feet of water over its shoalest part, bearing S. 41° E., and distant 2 miles from Scotch Bonnet island lighthouse.

McFaul shoal is a pinnacle of rock with 18 feet of water over its apex. It lies S. 77° E. distant 2½ miles from Scotch Bonnet island lighthouse.

Nicholson island, heavily wooded, one mile long easterly and westerly, and one-third of a mile in width, the western extremity of which bears N. 37° E., and is distant nearly one mile from Scotch Bonnet island lighthouse, is separated from the point of the same name by a passage three-quarters of a mile in width.

The 5-fathom line approaches to within 200 yards of all but the east side, from which a spit extends half a mile eastward, leaving a narrow winding channel between it and the shore bank extending from Nicholson point. This channel has a greatest depth of 21 feet, but should not be attempted by any one not well acquainted with the locality.

At Nicholson point the shore turns abruptly northwestward and trends in that direction for a distance of 8 miles, to the entrance into Weller bay, forming several small points with outlying boulders, and small bays with sand or gravel beaches affording good landing. Off this coast the soundings are more or less irregular, some shoals lying a considerable distance out.

Vessels, when eastward of a line between Scotch Bonnet island and Presqu'île point lighthouses, should exercise due caution.

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Moirā shoal.—From **Snider point**, situated N. 31° E. distant $2\frac{3}{4}$ miles from Scotch Bonnet island lighthouse, a bank extends out $1\frac{1}{4}$ miles southwestward. Moirā shoal having a least depth of $7\frac{1}{2}$ feet of water upon it lies $1\frac{1}{4}$ miles out on the southwestern end of this bank. It bears N. 12° E., and is distant $1\frac{3}{4}$ miles from Scotch Bonnet island lighthouse.

PRESQU'ILE BAY.—This bay, a natural harbour, takes its name from the peninsula of the same name which incloses it westward and southward, giving it entire protection from the force of storms. The length of the bay varies between $1\frac{1}{4}$ and 2 miles north-eastward and southwestward, and has a least width of $1\frac{1}{4}$ miles. Its shores are bordered on all sides with shallow mud flats more or less covered with weeds. Additional protection is given to the bay by the bar which extends across its entrance from **Gage point**, the east entrance point, to **Salt point** situated half a mile northward of Presqu'ile point lighthouse. A cut has been dredged through this bar to a depth of 11 feet.

The western entrance of Murray canal which connects bay of Quinte and Presqu'ile bay, thus affording an alternative route from and to Kingston, is situated in the northeast corner of the bay.

LIGHT.—On the southeast extremity of **Presqu'ile point**, the west entrance point of Presqu'ile bay, being also the east point of the peninsula of the same name, is erected a white octagonal stone tower, from which, at a height of 67 feet above the lake, is exhibited a *fixed white light*, visible in clear weather a distance of 13 miles. The lighthouse bears N. 36° W., and is distant 8.25 miles from Scotch Bonnet island lighthouse.

Fog signal.—Fifty feet westward of Presqu'ile point lighthouse a diaphone, in thick or foggy weather, sounds one blast of *six seconds* duration every *minute*.

CAUTION.—In the arrangement of buoys at the entrance of and inside of Presqu'ile bay, the bay, in connection with Murray canal, has been considered as being a continuous passage from the east end of bay of Quinte. Consequently, vessels entering Presqu'ile bay from lake Ontario, and also inside of the bay, must leave the red buoys on the port hand and the black buoys on the starboard hand.

Gas buoy.—A black cylindrical gas buoy, No. 21, exhibiting an *occulting white* light, is moored on the southwest extremity of Presqu'île Middle ground, a few yards northeast of the alignment of range lights No. 1 and No. 2. It bears North, distant 2,280 feet from Presqu'île point lighthouse.

Spar buoys, at the entrance of the bay, marking the edge of the shallow water which extends from the east side of Presqu'île point, are moored as follows: red spar No. 24, 425 yards E. $\frac{1}{2}$ S.; red spar No. 22, $2\frac{1}{2}$ cables N.N.E.; and red spar No. 20, 4 cables N. by W. from Presqu'île point lighthouse.

A black spar buoy, No. 23, marking the east side of the channel, is moored $3\frac{1}{4}$ cables N.E. by N. from the same lighthouse.

Range lights.—A *fixed white* light is exhibited from each of the three white square wood towers which are erected on cribs on the north side of Presqu'île bay, in waters of different depths. The bearing and distance from Presqu'île point lighthouse to No. 1 light is N. 48° W., a little over 2 miles; to No. 2 light, N. 49° W., 2 miles; to No. 3 light N. 27° W., 2 miles.

No. 2 and No. 1 lights in line, bearing N. 56° W., mark the axis of the cut, dredged to 11 feet, through the bar across the entrance of the bay. Each side of this cut is also marked with spar buoys.

No. 2 and No. 3 lights in line, bearing S. 76° W., mark the axis of the cut, dredged to 9 feet, through the mud flats in the northeast corner of the bay, leading to the entrance of Murray canal. The south side of this cut is marked with 3 black spar buoys.

Directions.—A vessel entering Presqu'île bay should, when abreast of the lighthouse on the west entrance point, be steering N. 56° W. with No. 2 and No. 1 range lights in line. These range lights should be carefully kept in line, as the dredged cut is very narrow, till No. 3 light bears N.E. by N., whence it should haul northward and head on the latter light with No. 1, the front light of the above range, over the starboard quarters. Pass southward of and close to No. 3 light, then bring the latter light in line with No. 2, the back light of the above range, directly over the stern. Keep these range lights carefully in one, with the light on the north entrance pier of Murray canal slightly over the port bow, and steering N. 76° E. one mile to the entrance of the canal (see page 97).

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Vessels other than small craft should not attempt to pass northward of No. 3 light.

Murray canal light.—Thirty feet from the end of the north pier at the western end of Murray canal, is erected a white circular column rising from an hexagonal base, from which a *fixed white* light is exhibited. For description of Murray canal see page 97.

Anchorage may be found in Presqu'ile bay, in 10 to 11 feet over thick mud, southwest of the alignment of range lights No. 2 and No. 1, affording entire protection in all winds.

Brighton, a village in Northumberland county, had a population of 1,421 in 1921. It is a station on the main line of the Canadian Pacific and the Canadian National railways, between Montreal, Kingston and Toronto. The village is situated $1\frac{1}{2}$ miles northwestward of Brighton wharf, by wagon road.

Brighton wharf, with 9 feet of water at the outer end of its northeast side, extends out 200 feet from the middle of the north side of Presqu'ile bay. It bears N. 43° W., and is distant 2.2 miles from Presqu'ile point lighthouse. A narrow channel, with a least depth of 7 feet, the direction of which is N.E. by N., leads to the southeast corner of the wharf. Smaller vessels of the "Canada Steamship Lines, Limited," which ply between Toronto and Montreal, call at this wharf.

Pilotage.—Any one not well acquainted should take a pilot if using the bay of Quinte route. These pilots although quite reliable are not licensed. They can be taken on at Kingston, where most of them live, or arrangements can be made in advance for them to meet eastbound vessels at Presqu'ile bay. They have no set charges.

Bald Head island.—The northeast part of this island is heavily wooded, the southwest part is in pasture. From the north side of the island, a bare and narrow strip of land consisting mostly of sand and gravel, extends two-thirds of a mile N.N.W., leaving a gap 400 yards in width between it and the mainland. This gap, the only accessible entrance into Weller bay, is situated 3 miles E.N.E. of Presqu'ile point lighthouse.

Becroft point, bearing S. 87° E., and distant 3 miles from Presqu'île point lighthouse, is the northern extremity of a narrow strip of land with a sand beach which extends $1\frac{3}{4}$ miles N.W. by N. from the sand dunes situated close to the lake shore $3\frac{1}{4}$ miles S. 70° E. of Presqu'île point lighthouse. These sand dunes, 20 feet in height, are fairly conspicuous and are partly covered with coniferous trees.

The gap, 500 yards in width, which separates Bald Head island and Becroft point, is very shallow; when the surface of the lake is low it may become almost dry.

Becroft clump.—One-third of a mile southeastward from the end of Becroft point there is a small knoll 10 feet in height, from which rises a small but fairly conspicuous clump of trees.

Weller bay, separated from lake Ontario by Bald Head island and the narrow strip of land described under the heading of Becroft point, is three quarters of a mile to $1\frac{1}{4}$ miles in width and 4 miles in length. Vessels drawing 10 feet of water can find good shelter in the northern part of the bay. The southern part with depths of 12 to 19 feet of water is accessible only for small craft, on account of the bar which extends across the bay from Bald Head island, and upon which there is a greatest depth of 5 feet. The village of Consecon is situated on the southeast side of the bay.

Dobbs bank, rocky, extends southwestward from the strip of land above described under the heading of Becroft point. It is about two-thirds of a mile wide and 3 miles long under the depth of 5 fathoms. Its southwest extremity bears S. 20° E., and is distant $2\frac{1}{2}$ miles from Presqu'île point lighthouse.

Shoal.—On the above bank, one mile off, there is a depth of 6 feet of water, over smooth rock, bearing S. 56° E., and distant $2\frac{3}{4}$ miles from Presqu'île point lighthouse.

Quick shoal, isolated, rocky, small in extent, with a least depth of 18 feet of water over it, lies S. 53° E., and is distant $1\frac{1}{2}$ miles from Presqu'île point lighthouse.

Gore shoal, isolated, rocky, three-quarters of a mile long east and west under the depth of 5 fathoms, and one-third of a mile wide, has a least depth of 17 feet of water upon it. It lies S. 5° E., and is distant $1\frac{1}{4}$ miles from Presqu'île point lighthouse.

CHAPTER III

FROM PRESQU'ILE BAY TO TORONTO

Proctor point.—The west side of Presqu'ile peninsula, with Proctor point which extends $1\frac{1}{2}$ miles southwestward from it, form the east and the southeast sides of Popham bay. The inner part of this narrow point being partly awash, Proctor point, when seen from the southeast, has the appearance of an island. The western outer part of the point is heavily wooded; the remainder is partly cultivated. Its southwest extremity bears S. 72° W. distant a little over $3\frac{1}{2}$ miles from Presqu'ile point lighthouse, and N. 56° W. distant 10 miles from Scotch Bonnet island lighthouse.

At Presqu'ile point, and for a distance of $1\frac{1}{2}$ miles westward from its east end, the shore bank, on the south side, is a little less than half a mile in width. Off the bay between Presqu'ile point and Proctor point, the shore bank is three-quarters of a mile wide. On the south side of Proctor point, the deep water is close in, but on the east side, rocky shoal flats extend one-third of a mile eastward.

A rocky bank, the southwest extreme of which bears W. by N. distant $1\frac{1}{4}$ miles from the southwest extremity of Proctor point, extends northwestward into Popham bay from the northwest side of the same point. This bank is very shallow for a distance of one-third of a mile northward from a point three-quarters of a mile northeastward of the southwest extremity of Proctor point. On the same bank there is also a depth of $7\frac{1}{2}$ feet, over rock, bearing N.W. by N. $\frac{1}{2}$ N. distant three-quarters of a mile from the southwest extremity of Proctor point.

Spencer point, the north entrance point of Popham bay, is the name given to a slight projection of the north shore. A bank 25 feet high skirts the shore closely for a short distance on each side of the point. Off the point and for a distance of one mile eastward, shoals under the depth of 6 feet extend out one-quarter of a mile.

A shoal, isolated, a quarter of a mile in diameter, with 21 feet least water upon it, lies S.S.W. one mile from Spencer point. The southwest side of Nicholson island open of Proctor point leads over this shoal.

Popham bay is described under the heading of Proctor point and under that of Spencer point. The bottom of the bay consists of a sand beach off which shallow sand flats extend out one cable.

Anchorage in $3\frac{1}{2}$ fathoms will be found in Popham bay, affording shelter in winds from northward to southeastward.

Camel shoal, isolated, rocky, with 14 feet least water upon it, is three-quarters of a mile northeast and southwest, and one-third of a mile in width. The shoalest water is near the southeast edge of the middle portion of the patch; it bears S. 44° W., and is distant one mile from Proctor point. Between the shoal and Proctor point there are depths of $6\frac{1}{2}$ fathoms.

The east side of the northern part of Proctor point in line with the east side of the southern part of the same point, bearing N. 32° E., leads in deep water half a mile eastward of Camel shoal. Presqu'île point lighthouse in line with the southern extreme of Proctor point, bearing N. 72° E., leads in deep water only 150 yards northward of the patch, but, one-quarter of a mile from its shoalest part.

Collier shoal, isolated, rocky, with 17 feet least water upon it, is one mile long eastward and westward, and half a mile wide. The shoalest water is on the north side of the middle portion of the patch; it bears S. 88° W., and is distant $2\frac{3}{4}$ miles from Proctor point.

The north side of the sand dunes described under the heading of Becroft point (see page 36), in line with the south extremity of Proctor point, bearing N. 89° E., leads on the north edge of Collier shoal. The clump of trees on Becroft point in line with the south extreme of Proctor point leads over the deeper part of the shoal, 21 feet, one cable southward of its shoalest part.

Ogden point.—From Spencer point to Ogden point, a distance of 4 miles, the shore trends W.S.W. A clay bank skirts the western part of this shore closely leaving little or no space for landing. The latter point has no conspicuous marks. It bears N. 80° W., and is distant $5\frac{1}{2}$ miles from Proctor point. At Spencer point the shore bank is three-quarters of a mile in width; it gradually diminishes in width towards Ogden point where it is only half a mile wide.

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Colborne wharf, 540 feet in length including a 250-foot stone-filled approach, extends in an easterly direction from a small point two-thirds of a mile eastward of Ogden point. Seven feet can be carried to the north side of the outer part of the wharf. Vessels cannot lie at the wharf in other than a land breeze. The village of Colborne, a station on the main lines of the Canadian Pacific and the Canadian National railways, is situated $1\frac{1}{2}$ miles northward.

Lakeport wharf.—The small village of Lakeport is situated on the lake shore one mile westward of Ogden point. It has a wharf, which, including a 145-foot stone-filled approach, extends out 735 feet southward. Nine feet can be carried to the outer part of the wharf. Vessels cannot lie at the wharf in other than a land breeze.

Mulcaster patch, with 36 feet least water over it, is only half a mile long northwest and southeast under depths of less than 10 fathoms. It lies 5 miles off shore, S. 62° E., distant 11 miles from Cobourg west outer pier light, and S. 64° W. distant $9\frac{1}{4}$ miles from Proctor point.

Mulcaster point is situated $2\frac{1}{2}$ miles westward of Ogden point. In the bay between them, containing Lakeport wharf, the shore bank is half a mile wide. Three-quarters of a mile eastward of the point there is a depth of 6 feet, 400 yards out. At Mulcaster point and for a distance of about half a mile on each side, a clay bank 30 feet high skirts the shore closely. On the point, a short distance inward, a windmill shows up well above the trees which fringe the edge of the bank.

Club point, low and unimportant, is situated 3 miles westward of the above point. In the bay between them, there is a low sand beach affording good landing. One mile eastward of the point, shoals under 6 feet extend out one-quarter of a mile. At the point, the shore bank is one-quarter of a mile wide.

From Club point to Cobourg, nearly 7 miles westward, the slight indentations of the shore form points and bays of no importance. Clay banks, varying in height between 15 and 50 feet, skirt most of this shore closely. The shore bank attains a width of three-quarters of a mile $2\frac{1}{4}$ miles westward of Club point, but diminishes in width towards Cobourg.

COBOURG, a residential town in Northumberland county, is a station on the main lines of the Canadian Pacific and the Canadian National railways between Montreal and Toronto. In 1921 it had a population of 5,330. The town is situated close to the lake shore on low and fairly level land. Its conspicuous marks are the steeples of three of its churches, the town hall and the asylum each with its small cupola, and the tall chimney of the water-works pumping house situated near the edge of the bank on the lake shore half a mile east of the harbour.

Large car ferryboats, well fitted for passenger service, ply the year round between Cobourg and Charlotte, N.Y. Smaller steamboats of the Canada Steamship Lines, Limited, plying between Toronto, bay of Quinte points and St. Lawrence river points above Montreal, call at Cobourg.

COBOURG HARBOUR.—The **outer harbour** is formed by the outer part of the east pier and the west pier.

The east pier, 900 feet long, with several slight bends, runs out in a southerly direction from the foot of Division street.

The west pier, the inner end of which is 450 yards westward of the east pier, extends 1,200 feet southward from the foot of Spring street, thence, making an angle of 120° , it extends 730 feet eastward thus enclosing the outer harbour, and leaving an entrance 375 feet in width.

The **inner harbour** is formed by the central pier and the inner part of the east pier.

The central pier, the inner end of which is 750 feet westward of the east pier, converges towards it, leaving an opening 240 feet wide.

Projecting from a point 390 feet southward from the inner end of the east pier, a small pier 320 feet long, extends westward towards the central pier, leaving an opening 190 feet in width, the entrance into the inner harbour.

Depths.—According to the latest soundings, May, 1920, there is 13 feet of water in the middle of the outer entrance with slightly deeper water on each side. In the middle of the dredged cut along the east pier, the axis of which is marked by a set of range lights, there is a least depth of 16 feet. In the inner harbour depths vary between $14\frac{1}{2}$ and 18 feet.

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A shoal patch with 12 feet of water upon it lies S.S.E. distant 100 yards from the outer end of the east pier.

The western part of the outer harbour is shallow.

Lights.—On the west pier, a few feet from its outer end, is erected a white pyramidal square reinforced concrete beacon from which is exhibited, at a height of 40 feet above the lake, an *occulting white light every three seconds*, visible 11 miles. The light is unwatched.

On the east pier, a few feet from its outer end, is erected a wooden pole from which is exhibited, at a height of 38 feet above the lake, an *occulting red light, every four seconds*, visible in clear weather a distance of 8 miles. The light is unwatched.

Range lights.—The front *fixed red* light is shown, at a height of 30 feet above the lake, from a lantern in front of a white diamond-shaped day mark on a mast erected on the west edge of the east pier, 1,270 feet from its outer end. In the day time the lantern is replaced by a black drum. In clear weather the light is visible a distance of 3 miles.

The rear *fixed red* light is also shown, at a height of 38 feet above the lake, from a lantern in front of a diamond-shaped day mark on a mast erected on the east side of the same pier, 376 feet N. 16° E. of the front light. In the day time the lantern is replaced by a black drum.

Storm signals are hoisted from a mast erected a few feet from the back range light.

Fog signal.—From a small white rectangular wood building erected on the outer end of the central pier, a diaphone, in foggy and thick weather, sounds one blast of *four seconds* duration every *forty-five seconds*.

The life-boat at this port is manned by a volunteer crew.

Peter rock, small in extent, partly awash, is connected to the main shore by a rocky ridge trending northeast with depths of less than 6 feet upon it. Southward and westward of Peter rock, depths grade down to 30 feet in one-third of a mile.

Light.—On the west side of Peter rock is erected a white circular stone tower surrounded with crib work, from which, at a height of 45 feet above the lake, is exhibited an *occulting white* light, visible 10 miles in clear weather. The light is unwatched. It bears S. 84° W. distant 2.9 miles from Cobourg west pier light, and S. 80° E. distant 2.6 miles from Port Hope light.

The course and distance from one mile S. 16° W. of Cobourg west pier light to 2½ miles south of Peter point light is S. 70° E., 44½ miles; to Oswego, N.Y., S. 60° E., 76½ miles; to Little Sodus bay, S. 53° E., 71¾ miles; to Great Sodus bay, S. 45° E., 64¼ miles; to Charlotte, N.Y., S. 25° E., 46¼ miles; to Port Dalhousie, Ont., S. 57° W., 64¼ miles; to eastern entrance of Toronto harbour, S. 78° W., 54 miles.

PORT HOPE, a town in Durham county, is a station on the main lines of the Canadian Pacific and the Canadian National railways from Montreal to Toronto. In 1921 it had a population of 4,458. The town is built close to the harbour on the rising land on each side of Smith creek which empties into the harbour. It also extends westward to the summit of a hill, about 175 feet in height, the south slope of which rises rapidly from the lake shore.

On the harbour front are situated the foundries of the Standard Ideal Manufacturing Company, a plant of the Dominion Canning Company, two elevators, and a factory.

Its conspicuous marks are the steeple of the Roman Catholic church and that of the Methodist church, and the town water-works steel stand-pipe rising well above the top of the trees of the heavily wooded hill. The tall chimney of the water-works pumping house is situated 125 yards from the lake shore, a few hundred yards west of the harbour. On the high land, about one mile northeast of the harbour, stands Trinity College school showing very conspicuously.

Small vessels of the Canada Steamship Lines, Limited, plying between Montreal, bay of Quinte points and Toronto, call here.

Port Hope harbour consists of an inner basin 420 feet wide and 640 feet long, an outer harbour, and an eastern arm 1,400 feet long and of an average width of 75 feet, into which Smith creek empties.

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The east pier, irregular in alignment, extending southward from the foot of Mill street, with the middle pier, forms the east arm, and protects the outer harbour.

The west breakwater, also irregular in shape, converges towards the east pier, leaving a narrow entrance 150 feet wide and 250 feet long.

The middle pier separates the east arm from the inner basin.

Depths.—In 1916 the entrance into the outer harbour, and its approach, were dredged and swept to a depth of 14 feet. The same dredging and sweeping, to the same depth, were continued along the east pier for a width of 175 feet and extended 225 feet into the east arm. North of this it shoals up rapidly.

In June, 1921, the Department of Public Works, Ottawa, reported that the above dredging had filled in, and that the channel had then a least depth of 8 feet.

Along the west and the north sides of the inner basin, there is $8\frac{1}{2}$ feet of water. Along the west side of the middle pier 1,600 feet in length, depths are as follows: in the inner basin, 8 feet; in the entrance to the inner basin, 11 feet; in the outer harbour, 12 feet. Along the south end of the middle pier, there is 11 feet. At the wharf on the west side of the entrance into the inner basin there is 15 feet.

The west part of the outer harbour is shallow.

Light.—On the east pier, 115 feet from its outer end, is erected a white square tower, from which, at a height of 40 feet above the lake, is exhibited a *fixed red* light, visible 4 miles. The light is watched, but is not under government control.

A day beacon is erected on the south end of the west breakwater, at the entrance of the harbour.

Fog bell.—Signals from vessels are answered by means of a bell attached to the base of the lighthouse. It is struck by hand.

Storm signals are hoisted from a mast erected on the east pier, 775 feet from its outer end.

The life-boat at this port is manned by a volunteer crew.

Canadian charts Nos. 61, 70 and 77 (*see p. 7*).
Varn $8^{\circ} 30' W.$ (Magnetic disturbance, *see p. 11*).

Magnetic disturbance.—At Port Hope, a small area close to the shore has a variation of 11° W., the normal variation for that vicinity being from 7° to 8° W.

A small shoal with 7 feet of water over boulders, lies one-third of a mile off shore two-thirds of a mile westward of Port Hope light.

Otty point is situated $2\frac{1}{2}$ miles westward of Port Hope. From Port Hope, a clay bank, 20 to 30 feet in height and treeless, skirts the shore closely leaving little or no space for boat landing. At Otty point the bank attains the height of 70 feet and is surmounted by a clump of large trees about one acre in area. The point is insignificant with shallow bights on each side.

The shore bank grades down to a depth of 30 feet in a distance of two-thirds of a mile outward.

Crysler point, 15 feet high, $5\frac{1}{2}$ miles westward of Port Hope, is a slight projection of the shore with shallow bights on either side. Off the point the shore bank grades down to 30 feet in a distance of less than half a mile. In the bight to the eastward the shore bank increases slightly in width.

Bouchett point.—From Chrysler point the clay bank which skirts the sandy shore, leaving a narrow space for boat landing, gradually rises until, at a distance of about one mile from the point, it attains a height of 90 feet. The top of this bank is fringed with trees; its slope is partly covered with trees.

At Bouchett point, 100 feet high, the top of the bank is cultivated and treeless. At this point the shore bends slightly inward towards Newcastle harbour, $4\frac{1}{2}$ miles westward.

A huge boulder, in 10 feet of water, with a least depth of one foot over it, lies 200 yards off shore, $1\frac{1}{2}$ miles eastward of Bouchett point.

Port Granby, a small village one-quarter of a mile inland, is not visible from the lake. It is situated in a depression of the land on the west side of a creek discharging its waters into lake Ontario, one mile eastward of Bouchett point.

Bond head.—A few hundred yards west of Bouchett point, the clay bank, after rapidly receding back at the outlet of a creek, again skirts the shore closely, leaving little or no landing space for boat

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landing. The top of the bank, which for a distance of $2\frac{1}{2}$ miles is uniformly 80 feet high, is covered with trees for a short distance inland. At the point, the top of the 50-foot bank is cultivated. Westward, the bank gradually diminishes in height towards Newcastle harbour, three-quarters of a mile distant.

Newcastle, a village in Durham county, is a station on the main lines of the Canadian Pacific and the Canadian National railways between Montreal and Toronto. It is situated $1\frac{1}{2}$ miles northward of the harbour of the same name. Two of its church steeples are visible from the offing.

Newcastle harbour, at the mouth of a creek, consists of two parallel piers 70 feet apart, and a breakwater. The east pier, 800 feet in length, extends out southward 270 feet beyond the outer end of the west pier. The breakwater, the shore end of which is 150 feet west of the west pier, converges towards the east pier, leaving an entrance 150 feet wide.

Eleven feet may be carried to the outer part of the east pier, and 7 feet to the elevator at the inner end of the east pier. Off the harbour the shore bank is three-quarters of a mile wide.

A small patch of boulders, with 9 feet least water upon it, lies $2\frac{1}{2}$ cables S. 30° W. of the entrance of the harbour.

From Newcastle harbour to Port Darlington, nearly 4 miles westward, the usual clay bank 10 to 40 feet high skirts the shore closely. Towards the latter harbour the shore bank lessens in width.

Port Darlington.—The harbour, at the outlet of Bowmanville creek, consists of two parallel piers 150 feet apart, both extending 1,150 feet southward. Nine feet can be carried to the inner end of the piers.

At the inner end of the east pier there are two elevators and a coal shed. Port Darlington can be picked up from the offing by the several summer cottages built on the sand beach on the west side of the harbour and also those on the top of the bank on the east side.

Light.—On the outer end of the east pier is erected a white wood freight shed, surmounted by a white wood tower, from which, at a height of 40 feet above the lake, a fixed light is exhibited in the following manner: The light shows red over an arc of 4 degrees, between the bearings of N. 12° W. and N. 8° W.; over an arc of

Canadian charts Nos. 61, 62, 73 and 77 (see p. 7).

Varn. $7^\circ 30'$ W.

30 degrees on each side of the red sector some of the unscreened light can be seen so that the light shows both red and white; on each side of the red and white sectors the light shows white. The light is watched, but is not under the Marine Department.

Directions.—At night, a vessel approaching the harbour should keep in the red sector until the entrance between the piers is picked up.

Bowmanville, a town in Durham county, is situated nearly 2 miles northward of the above harbour. In 1921 it had a population of 3,230. It is a station on the Canadian Pacific railway. A little over half a mile northward of the harbour, the Canadian National railways has a station of the same name. Two of the town's church steeples are visible from the lake.

Raby head.—From Port Darlington to Raby head, 2 miles southwestward, the coast is low sandy and gravelly, except at a nameless point one mile southwestward of Port Darlington, where there is a bank, 20 feet high, skirting the shore closely for a short distance, and also at Raby head where a clay bank rises abruptly to a height of 105 feet above the lake, with no landing space between it and the shore. Raby head is very conspicuous. The shore bank along this coast is half a mile in width.

At Raby head the shore makes a slight bend inward; it then trends westward for a distance of $4\frac{3}{4}$ miles to Oshawa wharf. The clay bank, varying between 25 and 80 feet in height, skirts the shore closely without landing space for a distance of 3 miles. The coast then changes its character to that of a low gravelly beach backed by low swampy land with some open water.

The shore bank along this coast is nearly three-quarters of a mile wide, except off Oshawa wharf, where it is half a mile in width. Shoals under 6 feet extend out one-third of a mile from the low point situated $1\frac{1}{4}$ miles eastward of Oshawa wharf.

Oshawa wharf, 5 miles westward of Raby head, extends out 700 feet southeastward from the northwest side of a wide open bay. Eight feet can be carried to the outer part of the wharf. Oshawa wharf can be picked up from the offing by its elevator and coal sheds on the beach at the inner end of the wharf, and also by the row of

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summer houses extending westward. The 65-foot bank at the point half a mile southwestward is fairly conspicuous. An electric railway runs between the wharf and the town of Oshawa, $2\frac{1}{2}$ miles northwestward.

Light.—A *fixed red* light is shown from a mast rising from the roof of the freight shed on the enlarged outer part of Oshawa wharf. The light being exhibited only when a vessel is expected is, therefore, not to be depended upon for the purpose of general navigation.

Oshawa is an industrial town in Ontario county. In 1921 it had a population of 11,904. It is a station on the main lines of the Canadian Pacific and the Canadian National railways between Montreal and Toronto. An electric railway runs to Oshawa wharf.

Gold and Ross points.—From Oshawa wharf to Port Whitby, $4\frac{1}{2}$ miles westward, the coast has no conspicuous features. A bank which at Gold point is 20 feet high and at Ross point 15 feet, skirts the shore closely. The former is situated $2\frac{1}{2}$ miles eastward, and the latter $1\frac{1}{4}$ miles eastward of Port Whitby; both points have outlying boulders extending 200 yards out. The shore bank along this coast is half a mile wide.

Port Whitby can be picked up from the offing by its elevator, the tall brick chimney of the water-works pumping house on the gravel beach 150 yards eastward of the harbour, and a row of summer cottages extending eastward half way to Ross point. The hospital for the insane, situated on the high land near the lake shore west of the harbour, with its buildings covering several acres of land, is very conspicuous. A spur of the Canadian National railways runs from Whitby Junction to the wharves at Port Whitby.

The harbour is situated in the southeast corner of a shallow bay triangular in shape with its apex pointing northward. The bay is half a mile long and half a mile wide. It was originally only partly protected by a sand bar. A breakwater has been constructed eastward from the east end of the bar to within 260 feet of the southeast corner of the bay, thus giving the harbour entire protection from the force of storms. The west pier extends south 650 feet from the east end of the breakwater. The east pier is only 395 feet long and is parallel to the west pier.

The harbour front consists of 1,500 feet of wharves, on which are built an elevator, a warehouse and coal sheds.

A strip 260 feet wide has been dredged along the wharves to a depth of 12 feet; beyond this the bay is very shallow. There is, however, a depth of nine feet 30 yards southward of the eastern part of the most westerly wharf. Ten feet can be carried midway between the entrance piers.

Light.—On the west pier, 50 feet from its outer end, is erected a white octagonal wood tower from which, at a height of 37 feet above the lake, is exhibited a *fixed white* light, visible 11 miles in clear weather.

Whitby, a town in Ontario county, had in 1921, a population of 2,804. It is situated $1\frac{3}{4}$ miles northward of the harbour. Whitby is a station on the main line of the Canadian Pacific railway.

The village of Whitby Junction, a station on the Canadian National railways, is situated half a mile northward of Port Whitby.

Richardson point.—From Port Whitby the shore trends W.S.W. $2\frac{1}{2}$ miles to Richardson point. At the point and on its east side a bank 20 to 30 feet high skirts the shore closely. The shore bank along this coast is from two-thirds to one-half mile in width.

Moore point.—From Richardson point to Moore point, $3\frac{1}{2}$ miles westward, there are two slight projections of the shore both with a clay bank 50 feet high skirting the shore closely. The shore bank along this coast, is about half a mile wide. At Moore point, which is situated $1\frac{1}{4}$ miles eastward of Frenchman bay old lighthouse, a 35-foot bank skirts the shore closely. Off the point the shore bank is three-quarters of a mile wide. On it is a depth of 8 feet one-quarter of a mile out.

One-third of a mile back of the point, there is a small hill 80 feet high on which is situated a good size barn showing up conspicuously.

Frenchman bay, half a mile in length and three-quarters of a mile in width east and west, is entirely protected from the force of storms by a narrow sand bar stretching across its mouth.

The entrance of the bay is between two parallel piers 630 feet long and 100 feet apart. A cut has been dredged between the piers

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and through the bar to a depth of 9 feet. The winding channel from the inner end of the pier to the ice-houses and the elevator on the east side of the bay has a least depth of 7 feet. The channel is not buoyed, and outside of it the bay is very shallow.

A disused lighthouse is erected on the outer end of the east pier.

From Frenchman bay, the shore, trending S.W., is nearly straight for a distance of $4\frac{1}{2}$ miles to a nameless slight projection of the coast. Westward of the sand-bar across the mouth of Frenchman bay, the usual clay bank, 70 feet high, skirts the shore closely for a distance of a little over one mile to the mouth of **Rouge river**. The river empties into lake Ontario through the gravel beach at its entrance. The sand beach, $1\frac{1}{4}$ miles long, westward of Rouge river entrance, affords good landing for boats. At the west end of this sand beach, **a knoll**, 120 feet high, the top of which is covered with trees but with a bare slope facing the lake, shows up conspicuously. At Rouge river the main line of the Canadian National railways approaches to within a hundred yards from the lake shore and follows it at about that same distance for 2 miles westward.

The shore bank, from Frenchman bay to Port Union, is about three-quarters of a mile wide.

Port Union, 15 miles northeast of Toronto, is a station of the Canadian National railways. It is situated close to the lake shore, half a mile southwestward of the above described conspicuous knoll. It consists of a water-tank, a station and a few buildings.

At the above mentioned nameless point, $4\frac{1}{2}$ miles southwestward of Frenchman bay, the shore makes a slight bend inward. It then trends S.W. to Balmy beach (East Toronto) $7\frac{1}{2}$ miles distant. From the point 65 feet in height, the clay bank skirting the shore closely gradually increases in height; at a distance of $4\frac{1}{2}$ miles it has attained an elevation of 380 feet.

St. Augustine seminary with its dome, situated on this high-land, is a very conspicuous object. Southwestward of the seminary the clay bank diminishes in height; at Balmy beach it is only 30 feet high. However, the high land, as it recedes from the lake shore, remains at about the same height.

Five and a half miles northeastward of Balmy beach the shore bank is nearly one mile wide; at the beach it is half that width.

From Balmy beach, $3\frac{1}{2}$ miles north-northeastward of Toronto harbour east entrance, the coast eastward consists of a low sandy beach.

Scarborough Beach.—The tall white tower of Scarborough Beach, an amusement park contiguous to Balmy beach in the vicinity of which Toronto is built close down to the shore, is a conspicuous object. At night, during the summer months, both the tower and the park being brightly illuminated can be seen from a long distance seaward.

Ashbridge bay was more than $2\frac{1}{2}$ miles long and half a mile wide until a couple of years ago, but it is now partly filled up. At the present time (1921) it is, at the most, 300 yards wide and less than one mile long, with a narrow arm extending 900 yards southwestward from the northwest corner of the bay. **Coatsworth cut**, the entrance of the bay, is between two short piers 450 feet apart, situated $2\frac{1}{2}$ miles northeastward of Toronto harbour. Both the cut and the bay are shallow, and can be used only by small craft.

TORONTO is the capital of the province of Ontario. In 1921 it had a population of 519,290. The city, the most important shipping centre on lake Ontario, is built on the gradually rising land which attains a height of about 375 feet at a distance of 3 miles from the harbour front. It is the railroad centre of the province. The Canadian Pacific and Canadian National railways have numerous branch lines to the important points not situated on their main lines. The "Canada Steamship Lines, Limited," operates a regular passenger and package freight service to and from the following points: Hamilton, Grimsby, Queenston, Ont. and Lewiston, N.Y. (where electric railroad connection can be made for Niagara Falls), Rochester, N.Y., Kingston, Ont., and Montreal, Que.; and ports on the north shore of lake Ontario, bay of Quinte, and Montreal. The "Niagara, St. Catharines and Toronto Navigation Company" operates a similar service to and from Port Dalhousie, where electric railroad connection can also be made for Niagara Falls.

In the day time, Toronto may easily be picked up from a considerably long distance seaward, by the clouds of smoke usually

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rising from and settling over the city; at night by the reflection of the city lights on the sky.

The most conspicuous marks are the tower of Upper Canada college situated on the high land in the northern central part of the city, and a high steel water-tank also on the high land but in the eastern part of the city. Other conspicuous marks are the steeples of St. James and St. Michael's cathedrals and St. Mary's church, the city hall square tower with its clock dial, and the Royal Bank and the Canadian Pacific Railway buildings both showing white. These churches and buildings are situated in the central part of the city, fairly close to the harbour front.

The Custom House is situated at the corner of Yonge and Front streets, one block north of the middle part of the harbour front.

The harbour is under the control of Harbour Commissioners. A new and extensive scheme of improvements is now being carried out; any information that may be given of the present state of the harbour (1921) may consequently be obsolete in the near future.

The harbour, to which there are two entrances, is formed, to the southward and to the westward, by a low sandy island, giving it entire protection from the force of storms. The harbour is about 2 miles long and has a greatest width of one mile. The island is fairly well covered with trees, and there are a great number of summer cottages along the side of the island facing the lake.

LIGHT.—On Gibraltar point, the southwest end of the above mentioned island, is erected a white hexagonal stone tower, from which, at a height of 66 feet above the lake, is exhibited an *occulting white light every eight seconds* thus: the light is shown during *four seconds*, followed by a period of darkness of *four seconds* duration. In clear weather the light is visible a distance of 14 miles.

Wireless (radiotelegraph) station.—The station with its two high masts painted white situated close to the lighthouse on Gibraltar point, is operated by the "Marconi Wireless Telegraph Company" for the Dominion Government and is available, day and night, for communication with vessels equipped with wireless apparatus, irrespective of the system adopted. The station is equipped with Marconi apparatus.

The call letters are V.B.G. and the range 350 miles. In communicating with the station the standard wave length of 600 meters should be used.

A 24-hour watch is kept at the station, and the station is instantly available in case of casualties to vessels.

If requested, information respecting existing weather conditions, the weather prevailing during the previous 24 hours and the weather forecasts of the Meteorological service can be communicated to vessels equipped with wireless apparatus.

Arrangements have also been made for the wireless telegraph station to communicate to passing vessels equipped with wireless apparatus any information not already published respecting changes in aids to navigation on the routes which the vessels are taking.

The station will handle the following messages without charge:—
Messages pertaining to the navigation of the ship.

- (a) Between the captain of the ship and any government department or government official.
- (b) Between the captain of the ship and the officer in charge of any wireless telegraph station.
- (c) Between the captain of the ship and any person whatever in connection with the following:—
 1. Weather conditions and forecasts.
 2. Ice.
 3. Reports on aids to navigation.

Masters of vessels equipped with wireless apparatus are requested to forward through the government wireless stations any information they obtain respecting defects in aids to navigation, or any other items that would tend to the safety and protection of navigation. The receipt of such information will be acknowledged in writing to the master by the departmental agent receiving the same.

At 11 p.m. the station will, without request from vessels, broadcast weather forecasts as received from the Meteorological Observatory, Toronto.

East entrance can readily be picked up from the offing, in the day time, by the two high steel electric power transmission towers situated on the sand beach, one on each side, near the entrance

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piers. It consists of two parallel piers 2,550 feet long, 400 feet apart. The piers are built across a narrow part of the island in the south-east corner of the harbour; they extend 1,250 feet southeastward into the lake and 700 feet northwestward into the harbour.

The channel between the piers and also the approaches to it, both from the harbour side and from seaward, have a least depth of 14 feet.

Range lights.—Front light.—On the enlarged outer end of the east pier is erected a red skeleton tower with white enclosed upper part, from which, at a height of 43 feet above the lake, is exhibited an *occulting red* light every *ten seconds*, thus: the light is shown during *six seconds*, followed by a period of darkness of *four seconds*. In clear weather the light is visible from a distance of 8 miles seaward; the light is not visible from the direction of the harbour. It bears N. 65° E., and is distant 1.97 miles from Gibraltar point lighthouse.

Fog bell.—In thick or foggy weather a bell is struck once at regular intervals of *three seconds*, by machinery, from the enclosed upper part of the above lighthouse.

Rear light.—The *fixed red* light is shown at a height of 66 feet above the lake from the southwest corner of the high steel electric power transmission tower erected on the east side of the east entrance. The light bears N. 30° W., and is distant 1,780 feet from the front lighthouse. It is only visible in a small sector on each side of the line of range.

Inner light.—This light is not visible from seaward; it only serves to guide vessels approaching the channel from the harbour side. The *fixed red* light is shown at a height of 27 feet above the lake, from a white square wood tower erected on the enlarged inner end of the east pier. The tower bears N. 33° W., and is distant 2,400 feet from the outer lighthouse on the same pier.

Fog bell.—In thick or foggy weather a bell is struck once at regular intervals of *five seconds*, by electricity, from the platform of the above lighthouse.

Fog signal.—In thick or foggy weather a diaphone, on the east pier, near the electric power transmission tower, sounds one blast of *four seconds* duration every *minute*.

Buoys.—A red spar buoy is moored 75 feet southwestward of the southwest corner of the east pier.

A black spar buoy is moored 50 feet northeastward of the northeast corner of the west pier.

Life-saving station.—The station is situated on the west side of the east entrance, opposite the rear light. The life-boat is manned by a regular crew. A 24-hour watch is kept from the observation tower close to the station and the life-boat is instantly available in cases of emergency.

Storm signals are hoisted from a mast near the rear range light on the east side of the east entrance. There is also a storm signal station established near the Harbour Commissioners' administration building on the wharf at the foot of Bay street.

The course and distance from one mile S. 33° E. of outer light of eastern entrance to Cobourg is N. 77° E. 54 miles; to Proctor point, N. 81° E. 72 miles; to Peter point, East 94 $\frac{3}{4}$ miles; to Oswego, S. 79° E., 122 $\frac{3}{4}$ miles; to Sodus bay, S. 73° E., 104 $\frac{1}{4}$ miles; to Niagara bar gas buoy, S. 24° E., 22 $\frac{1}{4}$ miles; to Port Dalhousie, South, 25 miles.

Off the east entrance the shore bank is a little over one mile wide. It keeps the same width for a distance of one mile southwestward, it then gradually diminishes in width towards Gibraltar point where the deep water is less than 400 yards out. Two hundred yards out from a point one mile southwestward of the east entrance there are depths of 6 feet. A shallow sand bank extends 250 yards southward and 350 yards westward from Gibraltar point.

Can and spar buoys.—The edge of the shore bank off Gibraltar point is marked as follows:—

Red can buoy, No. 2, moored in 30 feet of water, bears S.E., and is distant 4,350 feet from Gibraltar point lighthouse.

Red can buoy, No. 4, moored in 30 feet of water, bears S. 14° E., and is distant 2,700 feet from the same lighthouse.

Red can buoy, No. 6, moored in 30 feet of water, bears S. 31° W., and is distant 2,600 feet from the same lighthouse.

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Red can buoy, No. 8, moored in 18 feet of water, bears S. 80° W., and is distant 3,300 feet from the same lighthouse. The edge of the bank is about one cable beyond the buoy.

Red spar buoy, moored in 18 feet of water, bears N. 84° W., and is distant 3,250 feet from the same lighthouse. The edge of the bank is about 2 cables beyond the buoy.

From Gibraltar point the shore trends northward to the west entrance of the harbour, 1½ miles distant. The shore bank, in the line of the west entrance range lights, is nearly one mile wide.

Caution.—From the north pier of the west entrance to Humber river, 3 miles westward, a concrete breakwater is being built along a line approximately 1,100 feet from the shore to afford protection to this frontage. Much of the crib work is submerged, and while lighted as much as practicable, vessels should, to avoid the dangerous area, keep 1,200 feet from shore from the west entrance to the conspicuously showing exhibition grounds three-quarters of a mile westward, and at least 3,000 feet from shore thence westward to the Humber river.

The west entrance, situated at the northwest corner of the harbour, consists of two parallel piers 400 feet apart. The southern pier, 2,580 feet long, extends out 1,150 feet W.S.W. into the lake, 400 feet beyond the outer end of the northern pier.

In the channel between the piers there is a least depth of 12 feet. In the approaches to the entrance, on the lake side, 300 yards west-southwestward of the lighthouse on the outer end of the southern pier, there is a depth of 13 feet.

Range lights.—Front light.—On the enlarged outer end of the southern pier, is erected a white square concrete building surmounted by a red octagonal iron lantern which, from a height of 23 feet above the lake, exhibits a *fixed red* light, visible 6 miles. The light is not visible from the direction of the harbour. It bears N. 31° W., and is distant 1½ miles from Gibraltar point lighthouse.

Fog bell.—In thick or foggy weather, a bell is struck once every *five seconds*, by machinery, from the roof of the above lighthouse.

Rear light.—On the southern pier, 125 feet from its inner end, is erected a skeleton tower with white enclosed upper part, from which, at a height of 45 feet above the lake, is exhibited a *fixed red*

light, visible from all points of approach. The light bears N. 60° E., and is distant 2,400 feet from the front light.

A red spar buoy, marking the north side of a 2-foot spot, is moored 300 yards northeastward of the rear light.

A black spar buoy, to guide the ferryboats running to Hanlan point is moored in good water N. 60° E., distant one-quarter of a mile from the northeast extremity of the point.

A black spar buoy is moored in 8 feet of water on the south side of the harbour, bearing N. 57° W., distant 900 feet from the outer end of the Royal Canadian Yacht Club wharf, which is situated on the south side of the harbour nearly midway between the two entrances.

Hanlan point, on which there is an amusement park, is situated on the south side of Toronto harbour near the west entrance. Ferryboats run to it at frequent intervals.

The course and distance from one mile S. 60° W. of outer light of western entrance of Toronto harbour to Hamilton harbour entrance is S. 46° W., 24 miles.

Wharves and docks.—These are situated on the north side of the harbour. They have a frontage of nearly 2 miles. The harbour has a greatest width of one mile.

A concrete wharf, 800 feet in length, has been built from the inner end of the northern pier of the west entrance, nearly at right angles to it. New docks having a frontage of 2,000 feet, extend east from the inner end of this concrete wharf, and other docks actually under construction (1921) extend 2,700 feet farther east. The Dominion Shipbuilding Company is situated on the westernmost of these new docks, close to the west entrance.

Canada Steamship Lines, Limited pier is situated at the foot of Bay street, 5,200 feet eastward of the west entrance. It is 450 feet in length and 375 feet in width. This pier is used mostly for freight, but the passenger boats plying between Toronto and Hamilton and Grimsby leave from it. On it there are sheds with 65,500 square feet of floor surface. There are depths of 10 to 13 feet around the pier. For other wharves of the same company, see page 56. The Harbour Commissioners' administration buildings are situated on the southern end of the pier.

Toronto Ferry Company wharf is also situated at the foot of Bay street immediately eastward of the Canada Steamship Lines,

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Limited, pier. Ferryboats run regularly to Hanlan point southwestward, Island park southward, and Wards island southeastward across the harbour. At night the ferry landings are brightly illuminated.

Dominion Government public wharf is situated at the foot of Yonge street, immediately eastward of the Toronto Ferry Company wharf. In the slip eastward, which is 700 feet long, depths vary from 10 feet at the outer end to 6 feet at the inner end. Along the south end of the wharf, 225 feet, the depth is 14 feet.

The steamer *Dalhousie City*, of the Niagara, St. Catharines and Toronto railway (electric), running to Port Dalhousie, leaves from this wharf.

Canada Steamship Lines, Limited.—Most of the passenger boats of this company leave from the two wharves eastward of the above public wharf, at the foot of Yonge street and eastward. They are those running to Queenston, Ont., and Lewiston, N.Y., Olcott, N.Y., Charlotte, N.Y., and Kingston and Montreal.

Royal Canadian Yacht Club.—The club house and wharf are situated on the south side of the harbour, nearly midway between the east and the west entrance. A private ferryboat, for the use of the members of the club, runs from the end of the pier on the east side of the slip at the foot of Yonge street.

Toronto Electric Light Company wharf is situated at the foot of Victoria street eastward of the Canada Steamship Lines, Limited passenger boat wharves. This wharf is made conspicuous by the large power-house erected on it with its tall brick chimney. It can also be picked up from the other wharves by the fence built around the property, close to the edge of the wharf. The outer end, with a very small slip in it, is 300 feet in width.

Conger coal dock is situated at the foot of Church street. At the outer end of the slip at the foot of that street, the depth is 10 feet; the inner end is shallow. Along the face of the wharf, the depth is 9 feet for a distance of about 150 feet; it then diminishes to 7 feet, 350 feet eastward of the slip at the foot of Church street. Eastward and close to Polson Iron Works, there is a depth of 2 feet. See description of Polson Iron Works wharf.

Vessels making Conger coal dock and the wharves eastward (westward of Polson Iron Works) should steer for the slip at the foot of Church street, keeping on the alignment of Church street until they

are quite close in, on account of the shallow water which there is close in and southward of these wharves eastward of the alignment of the street.

Polson Iron Works are situated on a pier 900 feet in length and 250 feet in width which extends from the foot of Shelbourne street, N.W. by N. of the east entrance. At the outer end of the pier, on the east side, the depth is 12 feet. Depths gradually diminish inward; at the inner end there is only 2 feet of water. Along the eastern part of the outer side and in the slip on the east side of the pier the water is shallow. The shell of an old circular boat is in 2 feet of water 150 feet westward and parallel to the pier. Slightly deeper water extends westward of this wreck. See description of Conger coal dock.

Rogers coal wharf is situated immediately eastward of the pier east of Polson Iron Works. A narrow channel, with 15 feet least water, leads to it. The east side of this channel is marked with a red spar buoy; the buoy bears S. 64° E., and is distant 475 feet from the southeast corner of Polson Iron Works pier.

A vessel making this wharf should steer N. 17° E., passing close to the red spar buoy, and keeping this course until close to the wharf. At the wharf there is only 10 feet of water. Northeastward and eastward of the buoy the harbour is shallow.

The Toronto Coal and Dock Company is situated on the southern side of the entrance of Keating channel.

Keating channel, 130 feet wide and 2,400 feet long, runs in northeastward from the northeastern part of the harbour. It is the outlet of the **Don river**. The approach to Keating channel has been dredged to a least depth of 15 feet in the alignment of the channel.

A bascule bridge crosses the channel near its western end.

The Toronto Harbour Commissioners' plant is situated immediately eastward of the bascule bridge on the southern side of the channel.

Inward the depths decrease from 13 feet at the bridge to 9 feet at the eastern end of the channel where the Don river discharges into it.

Lights.—Each abutment of the bridge is marked with a *fixed white* light. A *fixed red* light on the bridge means that it is lowered;

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a *fixed green* light means that the bridge is raised and that a vessel may pass.

Ship channel.—The entrance of this channel is situated 300 yards northward of the inner end of the east entrance of the harbour. It is 400 feet in width and has been dredged to a least depth of 22 feet for a distance of a little over one mile to a temporary dam near the eastern end of the channel. A square basin 1,100 feet in side, is being dredged out immediately eastward of the temporary dam.

A bridge, crossing about 1,500 feet eastward of the western end of the channel, is now under construction.

The Baldwins Canadian Steel Corporation, Limited, is situated on the northern side of the ship channel described in the above paragraph.

Repairs to vessels.—Extensive repairs to machinery can be made by the Polson Iron Works and the Dominion Shipbuilding Company, both situated on the harbour front. Repairs to the hull can also be made by these firms but above the water line only, as there are no dry docks in Toronto harbour.

The nearest dry dock for vessels drawing $10\frac{1}{2}$ feet is at Port Dalhousie, and for vessels drawing more, at Kingston.

Depths in the harbour.—The greatest depths in the harbour are 27 to 30 feet. The 18-foot line approaches to distances of from 500 to 1,200 feet of the south side and to within half a mile of the west side. On the north and the east sides, improvements are being made, and it is proposed to dredge those parts of the harbour to be used by any lake-size vessel.

CHAPTER IV

FROM TORONTO TO HAMILTON

Humber bay is the wide open space westward of Toronto harbour, between the exhibition grounds to the east and Mimico to the west. Electric power transmission towers fringe the northeast side of the bay. Along the western side there are several well protected private wharves, affording good shelter for small craft. In the bay the soundings are fairly regular, but the shore bank varies from one-quarter to half a mile in width. On account of the improvements being made along the northern shore of the bay, even small craft should keep half a mile out as far westward as the entrance of Humber river.

Humber river.—The mouth of the river, about 100 feet in width, is situated on the northwest side of Humber bay. It bears W. by N., and is distant 3 miles from Toronto harbour west entrance. The river, near its mouth, is crossed by a fairly low highway bridge, and a short distance farther upstream by a railway bridge. It is navigable for a distance of about 2 miles for small craft.

Mimico, a suburb of Toronto, is situated on the western side of Humber bay. A hospital for the insane, situated a few hundred yards from the lake shore on the west side of the town, shows up conspicuously with its tall brick chimney. It bears S. 87° W., and is distant 5 miles from Gibraltar point lighthouse, Toronto. The hospital pump-house, with its fairly tall chimney, is situated nearby, on the lake shore, close to a well protected small wharf, affording good shelter for small craft, three-quarters of a mile eastward of Long Branch wharf.

The town pump-house, with its several smoke stacks, situated on the lake shore on top of a 15-foot bank, half a mile eastward of the hospital for the insane, shows up fairly conspicuously.

Long Branch is a summer resort built in a pine bush on the lake shore 6½ miles west of Gibraltar point, Toronto. It has a wharf extending 400 feet southeastward into the lake, at the outer part of which the depth is slightly over 6 feet. The shore bank southwest-

Canadian charts Nos. 62 and 77 (see p. 7).
Varn. 6° 30' W.

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ward of Long Branch is three-quarters of a mile wide, but along the shore northeastward it is about one-third of a mile in width.

Rifle ranges, known as Long Branch rifle range, are situated close to the lake shore, less than a mile westward of Long Branch, and about $1\frac{1}{2}$ miles eastward of Port Credit. It has several stop butts, which can be plainly seen from the offing. The soundings west of Long Branch are irregular and the bottom is rocky, the shore is bordered with shallow water extending as much as one-third of a mile out, and the shore bank as much as one mile.

Danger area.—On account of target practice, seven spar buoys have been placed to mark the limits of a danger area extending southward from the shore to a distance of 2,500 yards from the stop butts. The spars are painted white and are surmounted by a red sign having words "Danger, Rifle Ranges," painted on it. Any vessel passing inside these buoys during the hours of practice incurs serious risk, and no attempt should, under any circumstances, be made to cross the danger area as long as the red flag hoisted on the stop butts is left flying.

Port Credit, in Peel county had a population of 1,115 in 1921. It is situated close to the lake shore at the mouth of the Credit river. It is a station on the main line of the Canadian National railways (Grand Trunk) from Toronto to Hamilton. An electric railway is operated between Port Credit and Toronto. The two tall chimneys and the water-tank of the starch works on the northeast side, and the three chimneys and the water-tank of the brick works on the southwest side of the mouth of the Credit river, show conspicuously. The entrance piers, 100 feet apart, are in ruins, and are partly submerged. There is 4 feet of water between them at the outer end. Small craft, when well inside of the mouth of the river, will find good shelter.

The old lighthouse, a white square wood tower, 36 feet in height, erected on the outer end of the north pier, bears S. 73° W., and is distant $9\frac{1}{2}$ miles from Gibraltar point lighthouse, Toronto.

A slip 100 feet in width has been dredged out to a least depth of 13 feet, in a northwesterly direction, a distance of 500 feet through the bank at the brick works 3 cables southward of the entrance of the river. A breakwater, bearing S. 33° E., extends 400 feet out from

Canadian charts Nos. 63, 70 and 77 (*see p. 7*).
Varn. 6° $30'$ W.

the shore. A cut, 100 feet in width, has been dredged out to a depth of 10 feet, along the southwest side of the breakwater and for some distance outward in the same direction. The water on each side of this cut is very shallow and there are some cribs awash. A spar buoy marks the outer one of these cribs, 300 feet out from the outer end and in the direction of the breakwater. There are some rocks one to 2 feet in height, abreast of the spar buoy, on the southwest side of the dredged cut.

Since the last dredging, part of the west side of the outer part of the slip has filled up and the width of the channel at that end is hardly more than 50 feet. Close to the northeast side of the slip, 300 feet inward from the slight bend in the breakwater, there is a depth of 4 feet.

Off Port Credit the shore bank is three-quarters of a mile wide. From Port Credit the shore forms a wide open bay, thence, at a point bearing S. 25° W. distant 3 miles from Port Credit old light-house, it makes a bend inward and trends nearly straight for a distance of 4½ miles to Oakville. Along the whole of this shore shallow water extends as far out as 2 cables from the shore. At the point there is a depth of 7 feet, 3 cables out. Deep water, however, approaches to within three-quarters of a mile of the northeastern part of this shore and within half a mile of the southwestern part.

Oakville, a residential town in Halton county, is situated close to the lake shore at the mouth of Oakville creek, 16 miles southwestward of the west entrance of Toronto harbour, and 10 miles northeastward of the entrance of Hamilton harbour. In 1921 it had a population of 3,349. Its conspicuous marks are two church steeples and a steel water stand-pipe, all showing well above the top of the trees. Northward of the town close to the lake shore can be seen several mansions, the summer residences of some of the wealthy people of Toronto. It is a station on the Canadian National railways (Grand Trunk). An electric railway runs between Oakville and Hamilton.

Oakville harbour.—The entrance of the harbour is between two piers. The northeastern pier, 725 feet in length, extends out 430 feet into the lake, in a southeasterly direction, 150 feet beyond the outer end of the southwestern pier. At the outer end of the north-

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eastern pier, and at right angles to it, there is a 140-foot extension trending northeastward.

The southwestern pier is irregular in shape; at its outer end, the width between the piers is 160 feet, inward it is slightly less. The pier extends along the southwest side of the harbour for a distance of 500 feet, with shallow water along that part of it.

In 1921 the channel at the entrance to and inside the piers has been dredged to a depth of 12 feet, as follows:—

The east extreme of the dredged channel begins at a point 2,700 feet S. 42° E. from the southwest corner of the east pier, the channel being 100 feet wide, gradually narrowing to a width of 50 feet at a point nearly opposite and 25 feet from the lighthouse on the east pier. Between the piers the dredged channel is parallel to and 25 feet from the east pier. From the inside end of the piers the channel is 50 feet wide and 600 feet long, extending in a northerly direction to the mouth of Oakville creek. Piles mark the channel just inward of the entrance piers.

On the northeast pier, 43 feet from its outer end, is erected a white hexagonal wood tower. The light has been discontinued.

Storm signals are hoisted from a mast on the bank, 360 feet northeastward of the inner end of the northeastern pier.

From Oakville to Bronte, a distance of 3½ miles, the shore trending southwestward is bordered with shallow water extending less than a cable out. The five-fathom contour approaches to within half a mile of this shore.

Bronte, a village in Halton county, is situated at the mouth of Bronte creek, 6¾ miles northeastward of the entrance of Hamilton harbour and 19½ miles southwestward of the west entrance of Toronto harbour. It is a station on the main line of the Canadian National railways (Grand Trunk) between Toronto and Hamilton. It is also a station on the electric railway line which runs between Oakville and Hamilton. Its distinctive marks are the tall chimney of a flour mill on the north side of the creek near its mouth, the Methodist church back of the village and a summer pavilion on the sand beach on the south side of the harbour.

Bronte harbour consists of two piers extending eastward into the lake. The piers, about 80 feet apart, are nearly parallel and

curve slightly southward. The channel between the piers has a least depth of 5 feet. Above the piers the creek is shallow. The harbour is used mostly as a fishing station.

The shallow rocky flats on each side of the harbour extend one-quarter of a mile out. Half a mile southward of the harbour the shore bank is three-quarters of a mile wide.

Light.—On the outer end of the north pier is erected a white square wood tower, from which, at a height of 27 feet above the lake, is exhibited a *white fixed* light, visible 10 miles.

From Bronte to Burlington, a distance of $5\frac{3}{4}$ miles, the shore, with a bank 20 to 30 feet high skirting it closely for most of that distance, trends southwestward. This shore is also bordered with shallow water which extends one to two cables out. The shore bank defined by the 5-fathom line is three-quarters of a mile in width near Bronte, but does not attain a greater width than half a mile southwestward of one mile southwestward of Bronte.

Burlington, a town in the southwest corner of Halton county, is situated close to the shore $1\frac{1}{4}$ miles north of Hamilton harbour entrance. A large hotel situated in the southwestern part of the town shows up conspicuously. It has a wharf at the outer end of which there is about 6 feet of water. A breakwater built close to and parallel to the shore along the southern part of the town southwestward of the wharf, affords good shelter for small craft.

Burlington is a station on the main line of the Canadian National railways (Grand Trunk) between Toronto and Hamilton, and on the electric railway which runs between Oakville and Hamilton.

Mount Nemo, situated 7 miles northward of Hamilton, and the same distance westward of Bronte, is the name given to a hill which rises more or less abruptly from the highland of that locality. Mount Nemo is 750 feet above lake Ontario and is very conspicuous on account of its north and west sides being steep for a height of 100 feet from its summit, which is practically level for about three miles north and south.

Rattlesnake point is the name given to the steep south side of another conspicuous hill situated three miles northward of Mount

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Nemo. The hill is 855 feet high. The sides of the hill which are visible from the lake are steep for a height of about 100 feet from the summit which is a fairly level plateau extending a couple of miles north and south. The height of land between Rattlesnake point and the last mentioned hill is 455 feet.

HAMILTON, an industrial city in Wentworth county, is situated at the west extreme of lake Ontario. In 1921 it had a population of 113,894. The main part of the city is built on low and fairly level land on the south side of Burlington bay, which name has been lately changed to that of Hamilton harbour. The residential part of the city extends to the plateau which rises abruptly to a height of 400 feet above the lake, with almost perpendicular walls, at an average distance of 2 miles southward of the harbour front. Hamilton is an important railway point, being served by the Toronto, Hamilton and Buffalo railway, and the Canadian National railways; the Canadian Pacific has access into Hamilton over the tracks of the former. The Canada Steamship Lines, Limited, operate a regular passenger and package freight service between Toronto and Hamilton. An electric railway runs northward to Oakville and another one eastward to Beamsville. The most conspicuous mark is a steel water tank situated near the edge of the cliff on top of above mentioned plateau.

Hamilton harbour.—The harbour is under the control of Harbour Commissioners. An extensive scheme of improvement is now being carried out, such as reclaiming a considerable part of the low and swampy land along the eastern half of the harbour front on the south side; any information that may be given of the present state of the harbour (1921) may consequently be obsolete in the near future.

The harbour, triangular in shape, with the apex pointing northward, is 5 miles long east and west and $2\frac{1}{2}$ miles wide. It has an area of more than 6 square miles and for the greater part is from 5 to 12 fathoms in depth with mud bottom. The north side is bold and fairly steep to, but the south and the northeast sides are low and bordered with shallow mud flats. Deep water approaches to within 3 cables of the west end of the harbour.

The harbour is separated from lake Ontario by a narrow strip of sand, 3 miles long and varying in width from 200 to 1,250 feet. On it is situated **Hamilton Beach**, a summer resort.

The entrance of the harbour is between two piers built through this strip of sand. The southern pier, 2,700 feet in length, extends out 1,300 feet into the lake, in a northeasterly direction, 400 feet beyond the outer end of the northern pier. The piers both extend 900 feet into the harbour. At their inner ends the piers are 90 feet apart, outward they are 170 feet apart. The channel between the piers has been dredged to a depth of 15 feet; both approaches to this channel have slightly greater depths.

In the day time the entrance can be picked up from the offing by four tall steel electric power transmission towers, two on each side, which are erected on the beach close to each entrance pier. A high steel water-tank, half a mile southward of the entrance, is also a conspicuous mark.

LIGHTS.—**Main light.**—On the beach, a few yards southward of the southern pier is erected a grey circular stone tower, from which, at a height of 75 feet above the lake, is exhibited a *fixed white* light visible from all points of approach. In clear weather the light is visible from a distance of 15 miles.

Outer light.—On the outer end of the southern pier is erected a white reinforced concrete tower, the lower part of which is square and the upper part octagonal, from which, at a height of 40 feet above the lake is exhibited a *fixed red* light visible 7 miles from all points of approach seaward. The light is not visible from the harbour. It bears S. 59° W., and is distant 1,570 feet from the above described main lighthouse.

Inner light.—On the inner end of the southern pier, 1,300 feet from the main lighthouse, is erected a white square wood tower, from which, at a height of 20 feet above the lake, is exhibited a *fixed red* light, visible from the direction of the harbour only. It bears N. 64° E., and is distant 1,300 feet from the above described main lighthouse.

Fog signal.—From the northeast side of the outer lighthouse, a diaphone, in thick or foggy weather, sounds *two blasts* of *three and one-half seconds* duration with an interval of *three seconds* between each, followed by a period of silence of *fifty seconds* duration.

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Storm signals are exhibited from the north side of the above described main lighthouse.

Bridges.—There are two swing bridges across the entrance piers—the Canadian National railways (Grand Trunk) bridge and the highway bridge over which passes the electric railway which runs between Hamilton and Oakville.

Lights.—A red light shown on the middle of the span means that the bridge is closed; a green light means that the bridge is open and that a vessel may pass.

Signals.—Vessels should sound two long, followed by two short blasts of the whistle, when at least one mile away to give time for the bridges to be swung open.

Wharves.—The wharf of the Steel Company of Canada extends out from the outer part of the point situated at about the middle of the south side of the harbour. It is 250 feet long and has 13 feet of water at its outer part.

The International Harvester Company plant is contiguous to and southward of the above plant. The wharves are built along a part of the frontage of the plant on each side of Sherman inlet which is situated at the foot of Sherman avenue. The wharf on the east side of Sherman inlet is 490 feet long and trends S.S.W. Westward of Sherman inlet the wharf frontage is 1,000 feet and trends W.N.W. Two buoyed channels leading to these wharves, one from westward and the other from northward, have been dredged to a least depth of 13 feet, out of the mud flats fronting them.

The Harbour Commissioners operate a public wharf at the foot of Catharines street, on which there is a freight shed with floor surface of 28,500 square feet. On the east side, the wharf is 430 feet long, on the west side it is 250 feet long. Sixteen feet can be carried to all sides of the wharf.

A new revetment wall has been built by the Harbour Commissioners for a distance of 1,650 feet eastward of the above wharf, thence 1,160 feet southward to the foot of Wellington street. Fifteen feet can be carried to this revetment wall except at the outlet of a sewer 1,000 feet eastward of the Harbour Commissioners wharf where there is only 8 feet of water at present.

One hundred feet westward and nearly parallel to Harbour Commissioners' wharf, there is another wharf 250 feet long and 30 feet wide, with a freight shed covering nearly the whole of it. Fourteen feet may be carried to the east side of this wharf.

The wharf on the east side of the slip at the foot of James street, 400 yards westward of Harbour Commissioners' wharf, is operated by the Canada Steamship Lines, Limited. The passenger boats plying between Toronto and Hamilton leave from it. On it, in addition to the passenger shed, there is a freight shed with a floor surface of 6,000 square feet. There is 14 feet of water in this slip. Vessels approaching this slip should do so from the north so as to clear the shallow water which extends out 300 yards northward from the shore between this slip and the ferry wharf eastward.

The irregular pier with the wharf extending westward from its inner end, situated on the west side of the above mentioned slip at the foot of James street, are also operated by Canada Steamship Lines, Limited, but for freight mostly. On them are sheds with floor surface of 20,000 feet. There is only 9 feet along the west side of this pier, but along the south wharf there is 15 feet of water. To carry 14 feet to the latter a vessel should approach it from a direction slightly west of north, passing about 50 feet westward of the west side of the pier.

Brown wharf is situated at the foot of McNab street, 200 yards westward of the Canada Steamship Lines, Limited at the foot of James street. It is 170 feet long on the north and the west sides and 200 feet long on the east side. It has a freight shed with floor surface of 18,000 feet. There is 15 feet along all the sides of this wharf except at the inner ends, where it is a little shallower.

The wharf between the latter two, or eastward of Brown wharf, having been burnt some years ago is still in ruins and there is shallow water around its northwest corner.

The remainder of the south side of the harbour consists of ruins, wharves for the handling of ice only, boat-houses and club houses, and unused wharves such as along the Grand Trunk railway tracks at the west end of the harbour and along which there is 7 to 9 feet of water.

Holy Sepulchre cemetery wharf, 95 feet long and 25 feet wide, extends out from the northern side of the harbour across from about the ferry wharf, $1\frac{1}{4}$ miles westward of Wabassa park wharf.

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A cut, 60 feet in width, bearing N.W. and leading to the eastern side of the wharf, has been dredged to a least depth of 6 feet.

Wabassa park wharf is situated at about the middle of the north side of Hamilton harbour. It is 380 feet long and 80 feet wide. Twelve feet can be carried to the outer end of the wharf, and 10 feet to both sides of its outer part. A ferry boat runs between this wharf and the ferry wharf at the foot of John street.

Ferryboats run from a small wharf at the foot of John street, to Wabassa park and Holy Sepulchre cemetery on the north side of the harbour.

Desjardins canal.—The entrance of the canal is through a cut in the narrow ridge of land 105 feet in height and steep on both sides, at the west extreme of the harbour. At the entrance the canal is only 40 feet in width, thence west-westward $2\frac{1}{2}$ miles to Dundas, its western end, it is 60 to 75 feet wide, with depths varying from 3 to 6 feet and with no locks. At the Dundas end there is a turning basin 500 by 150 feet in size.

The canal runs through a swamp with fairly bold sides, known as **Cootes Paradise**. It is used only by small craft.

The principal industries on the south side of the harbour in addition to the Steel Company of Canada, with several smoke stacks, and the International Harvesters Company of Canada, with several tall chimneys, the wharves of which are described above, are the Grasselli Chemical Company, with a tall chimney, the National Steel Car Company, and the Dominion Power and Transmission Company. The latter two are situated close to the shore east of Ogg inlet $1\frac{1}{2}$ miles eastward of the Steel Company of Canada wharf and nearly due south of the inner lighthouse. The Dominion Power and Transmission Company can readily be picked up by its two tall chimneys, both alike and only a few feet apart. The Grasselli Chemical Company is situated on the east side of Gages inlet one mile eastward of the Steel Company of Canada wharf.

Repairs.—Small repairs only may be made to machinery. Hamilton has no dry dock. The nearest dry dock for vessels drawing $10\frac{1}{2}$ feet is at Port Dalhousie, and for vessels drawing more, at Kingston.

CHAPTER V

FROM HAMILTON TO NIAGARA RIVER

The highland, which at Hamilton is about 2 miles southward of the harbour, as mentioned in the description of Hamilton, falls back $1\frac{1}{2}$ miles at the east end of the city. It then gradually approaches the shore again towards Grimsby, where it is only one mile inland. From there, it falls back until at Queenston on the Niagara river it is 6 miles from the lake shore.

Westward of Grimsby the highland rises abruptly, but eastward of the same place it rises more gradually. The low and fairly level land between the highland and the lake shore, a part of what is known as the famous Niagara belt, is most adaptable for fruit-growing. Numerous orchards and vineyards are seen from the offing.

Fiftymile point.—From Burlington, the shore which consists of a fine sand beach, as already mentioned in the description of Hamilton Beach, trends a little east of south in a gentle curve for a distance of 4 miles. From here the curve of the shore becomes more accentuated. The shore, which at the same time changes its character to that of a low bank, then trends east-southeastward for a distance of about 5 miles to Fiftymile point, forming two slight nameless points with shallow bights on each side. On account of the absence of distinctive marks, Fiftymile point, being low, is only picked up from the offing with difficulty.

The shore bank, for the first 5 miles along this coast, is half a mile wide; it then rapidly increases in width until, $2\frac{3}{4}$ miles westward of Fiftymile point, it has acquired three times that width, at the same time the soundings becoming irregular and the nature of the bottom changing to that of a diversity of rock, boulders, or sand. It then diminishes in width towards the point off which it is only half a mile wide.

From Fiftymile point to the point at Grimsby, $3\frac{1}{4}$ miles south-eastward, the shore forms a wide open shallow bight, off which the soundings are irregular and the shore bank attains a width of $1\frac{1}{2}$ miles.

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Near Fiftymile point there is a depth of 15 feet bearing nearly due East and distant one mile from the north extreme of the point. There is also a depth of 21 feet bearing N. 87° E. and distant 1½ miles from the same point. Off the point at Grimsby the shore bank is two-thirds of a mile wide.

Grimsby.—Fortymile creek, the mouth of which is on the east side of the point situated 3¼ miles east-southeastward of Fiftymile point, runs through the village of Grimsby about two-thirds of a mile from the lake shore. Grimsby, which is situated 14 miles eastward of Hamilton, had a population of 2,002 in 1921. It is a station on the Canadian National railways and on the Hamilton, Grimsby, and Beamsville (electric) railway.

The entrance of Fortymile creek is between two short wooden piers about 100 feet apart. Shelter may be found for small boats just inside the entrance. There is only 2 feet of water over the sand bar at the entrance.

Grimsby Beach, a summer resort, on the lake shore, is situated in a clump of pines, 1½ miles eastward of the mouth of Fortymile creek. (See Grimsby).

It has a wharf about 300 feet in length, which juts out at right angles to the shore, at the outer part of which there is 6 feet of water.

From Grimsby Beach the shore trends slightly south of east to a point 5 miles distant, and has a shore bank about one mile in width with irregular soundings and shallow water extending out as much as one-quarter of a mile at places.

From this point, which is also situated 6½ miles east of Port Dalhousie, the shore turns inward to form a wide open bay, in which the shore bank is a little more than half a mile wide. Clay banks 25 to 45 feet in height follow most of the shore closely, leaving little or no space for boat landing. There is a sand beach at Port Jordan and another one 2 miles westward, affording good landing.

Jordan harbour, 5 miles westward of Port Dalhousie, is the name given to a shallow bay one to 5 cables in width and 1½ miles in length, situated on the southwest side of the above mentioned wide open bay. The mouth of the bay is entirely protected by a low and narrow sand bar, through which there is a narrow entrance pro-

ected on the east side by the remains of an old pier jutting out into the lake at right angles to the shore; some of the ruins are submerged at the outer end. The entrance of the bay is crossed by a stationary highway bridge having a 5-foot clearance. Over the shifting sand bar at the entrance there is, at times, less than 2 feet of water. The bay has an average depth of 3 feet with slightly deeper water just inside the entrance.

PORT DALHOUSIE, a town in Lincoln county, had a population of 1,524 in 1921. It is situated on the lake shore $23\frac{1}{2}$ miles east-southeastward of Hamilton harbour entrance and 9 miles west-southwestward of Niagara river entrance. It is a station on the Grand Trunk railway, and on the Niagara, St. Catharines, and Toronto electric railway which runs to Niagara Falls. The principal industry is the Maple Leaf Rubber Company, which is situated between the first locks of the old and present canal. Port Dalhousie, the lake Ontario entrance of the present Welland canal, is also the port of St. Catharines. The entrance of the harbour is between two parallel concrete piers, 200 feet apart. The east pier, 2,300 feet in length, extends out 1,500 feet from the shore, 250 feet beyond the outer end of the west pier.

In the approach of the harbour, a cut, the sides of which are nearly in the alignment of the entrance piers, has been dredged to a least depth of 16 feet for a distance of about 1,000 feet northward of the outer end of the east pier. The least depth in mid-channel between the entrance piers is 14 feet, but 11 feet of water will be found 70 feet from the east pier, about 200 feet north of the rear light, and also 10 feet, abreast of the same light, 70 feet from the west pier. Southward of the inner end of the entrance piers, the harbour widens out and a central pier divides it into two parts; lock No. 1 of the old canal now out of use, is on the west side, and lock No. 1 of the present canal is on the east side of the inner part of the harbour. The harbour has a greatest width of 725 feet and the distance from the inner end of the east pier to lock No. 1 of the present canal is 2,000 feet.

On the west side there are depths of 9 and 10 feet; on the east side and in that part of the harbour towards the entrance of the present canal, the least depth is 12 feet. The Niagara, St. Catharines and Toronto railway runs down along the wharves on the

depth of 10½ feet in the opening. This least depth can be increased by previous arrangement with the lockmaster at lock No. 1, who may allow the level of the basin to raise by about one foot, and thus increase also the depth of water over the sill of the gate of the dry dock by the same amount, or to 11½ feet.

Coal.—Steam coal, for fuel, can be obtained in limited amount at the Hutchison Estate coal chutes, which are situated at the south end of the east entrance pier.

Rifle ranges, with one stop butt, are situated about half a mile eastward of Port Dalhousie. On account of rifle practice, the danger area not being marked with buoys, vessels should not pass closer than 1¼ miles off shore. Any vessel passing closer in incurs serious risk, and no attempt should, under any circumstances, be made to pass close in as long as the red flag hoisted on the stop butt is left flying.

Supplies.—While a vessel is making lock No. 1 orders can be given for provisions or small supplies, and these will be delivered a few locks further up the canal. Vessels going down, can telephone from up the canal, and have supplies delivered at lock No. 1, when they pass through.

Welland canal.—The present canal, from Port Dalhousie to Port Colborne, the lake Erie end of the canal, has 25 lift-locks and one guard lock each 270 feet long (available length 255 feet) 45 feet wide and designed to have 14 feet over the sills. However, on the upper sill of lock 26 at Port Colborne, the depth may be subject to fluctuations in lake Erie due to wind, and be considerably less.

Vessels are restricted to 4 miles per hour in passing through the canal reaches. Across the canal are numerous bridges which swing on signal.

For rules and regulations see '**Rules and Regulations** for guidance and observance of those using and operating the canals of the Dominion of Canada,' published by the Department of Railways and Canals, Ottawa.

Port Weller, the lake Ontario entrance of the new Welland ship canal, is situated 2½ miles northeastward of Port Dalhousie and 6¼ miles westward of Niagara river. The harbour, an artificial one, consists of two breakwaters of earthwork and reinforced concrete

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cribwork about 800 feet apart, except at the north end, where they converge, leaving an entrance 400 feet in width. The breakwaters, which at present are uneven in width, extend true North from the shore a distance of nearly $1\frac{1}{4}$ miles.

The total length of the new canal will be 25 miles, and the difference in level between the two lakes, about 325 feet, will be overcome by seven locks, each having a lift of $46\frac{1}{2}$ feet. The locks will be 800 feet in length and 80 feet in width. The depth of water in the canal will be 25 feet, but all the structures will be sunk to a depth of 30 feet, so that the canal may be deepened at any future time by dredging out the reaches.

Lights.—Efforts are being made to keep the outer extremity of the breakwaters suitably marked, and to maintain efficient lights. On the outer end of the west embankment is erected a pole, from which, at a height of 32 feet above the lake, is exhibited a cluster of *fixed white* electric lights.

As some of the cribs may be submerged at times, mariners are warned to give the locality a wide berth until the outer work is completed and permanent lights are established.

Fog bell.—Close to the above lights, a fog bell operated by electricity, will strike at regular intervals during thick or foggy weather.

Fourmile point.—From Port Weller the shore being very nearly straight trends east-northeast to Fourmile point, 4 miles distant. At this low gravelly point, covered with tall trees and swampy on the east side, the shore turns inward and trends very nearly East for a distance of $2\frac{1}{4}$ miles to the mouth of Niagara river. Niagara bar, a shoal of extensive size, extends from this point and the shore eastward. (See page 77).

The shore bank from Port Weller to Fourmile point diminishes from $1\frac{1}{4}$ miles to two-thirds of a mile in width.

Niagara-on-the-Lake. a town in Lincoln county, is situated on the west side of the mouth of Niagara river. Tall trees hide most of the town and comparatively few buildings are seen from the lake. It is a station on a branch of the Michigan Central railway which runs from Niagara Falls. The Lake Shore division of the Niagara, St. Catharines, and Toronto electric railway runs between St. Catharines and this town.

A ferry, carrying passengers only, is operated between Niagara-on-the-Lake, Ont., and Youngstown, N.Y.

Fort Massassauga, with its earthwork and the blockhouse in the middle of the low ground inside the fort, is situated on the edge of the bank at the west entrance point of the river. It is fairly conspicuous.

Queen Royal hotel, a building of considerable size surmounted by a small tower, is situated close to the edge of the bank on the west side of the river, one-third of a mile southeastward of Fort Massassauga.

Other conspicuous marks, visible from seaward, are the Presbyterian church steeple in the western part, the water stand pipe in the central part, and the Roman Catholic church steeple in the eastern part of the town.

Wharf.—The wharf of the Canada Steamship Lines, Limited, is situated along the east side of the river, 7 cables from the west entrance point. There is deep water along the wharf. Back of the wharf there is a slip with a least depth of 5 feet affording good shelter. On account of the $1\frac{1}{2}$ - to 2-knot current at the entrance of the river, the swell of the lake is not felt at the wharf during storms.

Range lights.—**Front light.**—Near the southeast end of the wharf is erected a white square wood tower, from which, at a height of 30 feet above the lake, is exhibited a *fixed red* light visible in clear weather in a small sector on each side of the line of range from a distance of 7 miles seaward.

Rear light.—Close to the shore, 670 feet from the front light, is erected a white square tower from which, at a height of 43 feet above the lake, is exhibited a *fixed red* light, visible in clear weather in a small sector on each side of the line of range from a distance of 8 miles seaward. The two lights in one bear S. 24° E.

Fog signal.—A diaphone situated on the edge of the river, 3 cables below the front light, sounds one blast of *three seconds* duration every minute in thick or foggy weather.

Gas and bell buoy, and bell buoy.—(See below.)

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Rifle ranges, the line of fire of which is about N.W., are situated close to the shore one-quarter of a mile westward of Niagara river entrance. Other ranges, the line of fire of which is about N.N.W., are situated close to the shore one mile westward of the river entrance. On account of rifle practice, the danger area not being marked with buoys, vessels should not pass closer than $1\frac{1}{4}$ miles off shore. Any vessel passing closer in incurs serious risk, and no attempt should, under any circumstances, be made to pass close in as long as the red flag hoisted on the stop butts is left flying.

Niagara river separates the province of Ontario from the state of New York. From the mouth of the river up to Niagara Falls, a distance of nearly 11 miles, the international boundary follows very nearly the middle of the river. The river is navigable as far up as Queenston, Ont., 5 miles from Niagara-on-the-Lake. The Canada Steamship Lines, Limited have a wharf at Queenston, and also one at Lewiston, N.Y. across the river. This part of the river is deep and the sides are bold and fairly steep to, except at the mouth, on the west side, and just inside the river on the east side, where there are shallow banks extending out about 200 yards.

Brock monument, a tall circular column erected on the highland south of Queenston, showing above the skyline, can be seen from a considerable distance on the lake.

Fort Niagara, an old fort, in the state of New York, is situated on the east point of the mouth of the river. The fort and the old stone buildings inside are conspicuous.

The most conspicuous mark, however, is a tall cylindrical steel water-tank situated 1,350 feet eastward of the east extreme of the point.

Light.—Close to the shore on the south side of the east point of the mouth of the river, is erected a grey octagonal stone tower, 65 feet in height, from which, at a height of 91 feet above the lake, is exhibited an *occulting white* light, every *six seconds*, visible a distance of 14 miles.

A coast guard and storm warning station is located on the east side of the river entrance. Day and night storm warning signals are displayed from a steel tower on the west side of the fort a few yards west of the coast guard station. The life-boat is manned by a regular crew and a 24-hour watch is kept.

Canadian charts Nos. 63, 66 and 77 (see p. 7).
Varn. $7^{\circ} 30' W$.

Youngstown, a small town in the state of New York, is situated on the east side of the river about one mile above Fort Niagara. The chief importance of this town, from the point of view of navigation, is that it has a tall steel water stand-pipe which is conspicuous and may be used as a leading mark for vessels crossing Niagara bar in a northward or southward direction. See directions, p. 79.

Niagara bar.—The silt from the river has formed a bank 3 miles wide at the mouth of the river. The shallow part of this sand bank extends out $3\frac{1}{2}$ miles in a northeasterly direction from Fourmile point. It has an average width of one mile, under the depth of 18 feet. On it are several ridges trending northwestward and southeastward, each with a least depth of 9, 10 or 11 feet. The outer one of these ridges bears N. 5° E., and is distant $2\frac{1}{2}$ miles from Fort Massassauga on the west entrance point of the river. Southeastward of the shallow part of this bank which is called Niagara bar, and the shoal waters on each side of the river, there are depths of 18 to 30 feet. Shallow water, for a width of 300 to 400 yards, borders the shore for several miles on each side of the mouth of the river.

Clearing marks.—Brook monument in line with Fort George flag-staff near the rear light, Niagara-on-the-Lake, and also with the west corner of the south blockhouse of Fort Niagara bearing S. 3° W., leads in good water clear of the shallow part of Niagara bar, 1,000 feet eastward of the gas and bell buoy.

Gas and bell buoy.—A red cylindrical gas buoy surmounted by a steel frame supporting a bell rung by the motion of the buoy on the waves, and exhibiting a *red occulting* light is moored in 28 feet of water on the northeast side, one-quarter of a mile westward of the east side of Niagara bar. The five-fathom line is half a mile northward of the buoy. The buoy bears N. by E. and is distant $2\frac{1}{2}$ miles from Fort Massassauga on the west entrance point of the river.

At the west extreme of the east entrance point the deep water is only a few feet off. From this point the 18-foot contour trends northwestward for a distance of $8\frac{1}{2}$ cables and then abruptly turns eastward. The northwest extreme of the area defined by this contour bears north and is distant nearly 6 cables from Fort Massassauga. On

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this area is a small patch with 5 feet of water upon it, bearing N. by W. and distant 4 cables from the northwest extreme of the east entrance point of the river.

Clearing marks.—Youngstown stand-pipe in line with the west extreme of the east entrance point of the river bearing S. 41° E., leads in good water, clear and westward of the shoal area just described.

Bell buoy.—A black bell buoy is moored in 16 feet of water nearly 2 cables eastward of the west extreme of the area defined by the 18-foot contour described in the above paragraph. The buoy is rung by the action of the waves. It bears N.N.E. and is distant 6 cables from Fort Massassauga.

Tide rips and eddies.—The current at the mouth of the river is from 1 to 2 knots. This causes, in northerly winds, eddies to form close to the east entrance point, and tide rips near the black bell buoy and also near the point on which Fort Massassauga is situated. The tide rips are at times of sufficient size to be dangerous for small craft.

Rumsey shoal, with 13 feet least water upon it, is 3 cables long east and west and 250 feet wide. It lies $1\frac{1}{2}$ miles northeastward of Fort Niagara. Brock monument in line with Fort George flag-staff and also with the west side of the south blockhouse of Fort Niagara, leads in good water a short distance westward of the shoal.

Directions for vessels entering Niagara river.—The range lights brought in line bearing S. 24° E., lead over Niagara bar in 13 feet least water, passing close to and westward of a 9-foot spot when $2\frac{3}{4}$ miles from the front light, and also close to and eastward of another 9-foot spot $2\frac{1}{2}$ miles from the same light. The range also leads in 16 feet of water over the edge of the shoal water near the black bell buoy a little over a mile from the front range light. The range lights being only 690 feet apart it may be found difficult to keep them in one when passing over the bar on account of cross currents running eastward. Keep well on the range steering S. 24° E. until close to the wharf on the east side of the river.

In the day time a vessel may run Niagara bar, also in 13 feet of water, by bringing Youngstown stand-pipe in line with Fort

Niagara lighthouse and also with the northeast side of the north blockhouse of the fort, bearing S. 31° E. This range may be kept until one mile northward of the black bell buoy or 2 miles from the front range light. From this point, however, the vessel should run in on the line of the range lights.

A vessel may also, when 3 miles out, bring Brock monument in line with Fort George flagstaff and also with the west corner of the south blockhouse of Fort Niagara bearing S. 3° W. This range leads $1\frac{3}{4}$ cables eastward of the bell and gas buoy on the northeast side of Niagara bar. Keep on the range until the vessel is 2 cables southward of the buoy, then steer S.W., crossing the range of the lights, until Youngstown stand-pipe is brought in line with the west extreme of the east entrance point of the river bearing S. 41° E. Run in on these marks until the range lights are brought in one again and proceed up on that range, thus having passed in 20 feet least water east and southeastward of Niagara bar.

CHAPTER VI

BAY OF QUINTE

General description.—Bay of Quinte is a long, winding, comparatively narrow body of water lying between Prince Edward county and Amherst island in Lennox and Addington county on the south, and a small part of Northumberland, Hastings, Lennox and Addington counties on the north side.

Since the construction of the Murray canal in the southeast corner of Northumberland county, the western extremity of bay of Quinte has been connected with Presqu'île bay (see page 33), and Prince Edward county has been separated from the mainland, forming an island, thus affording an inland route between Kingston and Presqu'île bay for vessels of light draught. Vessels drawing less than $10\frac{1}{2}$ feet of water can proceed as far up as Trenton, near the west end of the bay. Murray canal has a least depth of 9 feet below the standard low water adopted by Canada and the United States, being 243 feet above mean tide New York; the mean summer level of the lake is usually 1 to 2 feet higher than this. (See datum, p. 5).

Pilotage.—(See page 35).

Adolphus reach, Pleasant point (see page 27), on the south side together with Sandhurst, a small village situated in Lennox and Addington county, on the north side, define the northeast limit of Adolphus reach. This reach is deep with fairly steep to shores, except as indicated below, and with a more or less bold coast. From Pleasant point, where it is a little over a mile wide, the reach trends west-southwestward for a distance of about 5 miles to **Cole Point** on the north side and Bongard wharf on the south side; it then turns gradually northward for a distance of another 5 miles to Glen island on the north side. The western part of Adolphus reach is somewhat narrower.

Prinyer cove is a well sheltered narrow bay, with 4 to 5 fathoms of water in it, situated on the south side of Adolphus reach, and $1\frac{1}{2}$ miles southwest of Pleasant point. It contains a wharf.

Storm signals.—(See page 28).

Bass island, small in extent, lies in a wide open shallow bay fronting Adolphustown on the north side of Adolphus reach, $7\frac{1}{2}$ miles westward of Pleasant point. The shoal bank, off the bay, extends one-third of a mile southward of the island. A very shallow ridge connects the island with the main shore.

Keith shoal is the name given to a shallow bank which extends out 400 yards from the south shore of Adolphus reach, south of Bass island. On it is a least depth of 7 feet.

Poole point is the west entrance point of the bay in which Bass island lies. The distance from Pleasant point to Poole point is $8\frac{3}{4}$ miles.

Glen island.—From Poole point westward, the north shore forms a point $1\frac{1}{2}$ miles long and about half a mile wide. The north side of the point forms the south side of Bass cove. The narrowest part of Adolphus reach is at the south extremity of the same point. Glen island, narrow and nearly half a mile in length eastward and westward; lies on the south side of the entrance to Bass cove, 200 yards northward of the western part of the point. There is a wharf, with 7 feet of water alongside, on the southern side of Glen island. The channel leading to it is not buoyed.

Shoal.—A shallow bank extends out 330 yards from the south side of Adolphus reach, southwestward of the south extremity of Glen island. The apex of this shoal is awash at low water.

Wharves in Adolphus reach.—Conway wharf is situated on the northern side of the reach 2 miles southwestward of Sandhurst; Allison wharf, on the same side of the reach, one mile southwestward of Cole point, and Young wharf, also on the same side of the reach, $1\frac{1}{4}$ miles westward of Poole point. Cressy, Bongard, and David wharves are situated on the southern side of Adolphus reach, 3, $4\frac{3}{4}$, and 8 miles southwestward of Pleasant point, respectively. There is also a wharf on the same side $2\frac{1}{2}$ miles southwestward of Bongard wharf.

All the above wharves are small, and as the water may be shallow close in, they should be approached with caution. Davis wharf

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should be approached from a northwesterly direction on account of Keith shoal, which is situated a short distance northward of it.

Westward of Glen island, bay of Quinte widens out considerably, forming a body of water somewhat triangular in shape; the west end of Adolphus reach being in the southeast corner, the south end of another reach the continuation of bay of Quinte extending northward from the apex, and Picton bay extending southward from the southwest corner of the triangle. Bass and Little coves are indentations on the eastern side of the same triangle.

Except for the shoal described above, following the description of Glen island, the water is good fairly close to the south of this triangular shaped body of water; the western side is clean, but the northern part of the eastern side should be given a good berth on account of the shoal water off Little cove.

Picton bay is the southernmost extension of bay of Quinte. The general trend of Picton bay is S.W. by W. It is about $2\frac{1}{2}$ miles long and varies in width from approximately 3,000 feet at its mouth to 350 feet at Chimney point and 350 feet at the south end.

Chimney point, with a wharf 80 feet by 100 feet, is situated on the west side, 2,800 feet northward from the south end of the bay.

At the middle of the mouth of the bay the depth of water is 32 feet. Inward the depths become gradually less. A winding cut, 300 feet in width, has been dredged to a least depth of $11\frac{3}{4}$ feet, from a point 1,400 feet northward of Chimney point wharf to **Brickley point**, which is situated 1,600 feet northward of the south end of the bay. The whole of the part of the bay southward of Brickley point has been dredged out to a least depth of 12 feet.

Buoys.—A red spar buoy on the west side and a black spar buoy on the east side mark the north end of the dredged cut. They are moored 1,400 feet northward of Chimney point wharf.

A red spar buoy on the west side and a black spar on the east side, marking the edges of the dredged cut, are moored 250 feet northward of Chimney point wharf. A black spar buoy marks the edge of the bank on the east side of the channel, opposite Chimney point wharf. A black spar buoy marks the edge of the bank off Brickley point.

Picton is the principal town of Prince Edward county. In 1921 it had a population of 3,324. The town is built close to the shore at the south end of the bay of the same name. It is the eastern terminal of a branch of the Canadian National railways which runs from Trenton where connection is made with the main lines of the same railway and with that of the Canadian Pacific railway between Montreal and Toronto. A daily automobile service is operated between Picton and Belleville, a distance of 16 to 18 miles. A ferry is operated between Picton and Deseronto, a distance of 12 miles northward.

Picton has several wharves with warehouses and coal sheds.

Bass cove, about a mile wide and $1\frac{3}{4}$ miles long, extends eastward of Glen island, which is situated on the south side of the mouth of the cove. As the cove has not been sounded, vessels proceeding in, should do so with caution.

Perch cove, immediately northward of Bass cove, is small and shallow. It is separated from Little cove by Trumpour point.

Trumpour point, narrow and elongated, separates Perch and Little coves. It is situated three-quarters of a mile northward of Glen island. The shore bank extends out 600 yards in the direction of the trend of the point. On it, half that distance out, there is a depth of 2 feet.

Little cove, formed by Trumpour point on the south side and Thompson point on the north side, is shallow.

Thompson point, as already mentioned, forms the north side of Little cove. It is situated $1\frac{1}{2}$ miles northward of Glen island. It is the east entrance point of the south end of the reach described in the following paragraph.

At Thompson point, situated 7 miles from Deseronto and $4\frac{3}{4}$ miles from Picton, bay of Quinte becomes narrow again, forming a fairly straight reach trending north-northeast. The reach is from one-third to one-half mile in width for a distance of nearly 5 miles to Green point where bay of Quinte widens out, makes a turn of nearly 10 points westward, and thence becomes narrow again.

Hay bay extends east-northeasterly from the above mentioned reach immediately northward of Thompson point, 6 miles from

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Deseronto. It is approximately 10 miles long and one-half to $1\frac{1}{2}$ miles wide. The water at the entrance of Hay bay is of good depth except for a shoal off the north entrance point (see Casey point below). Hay bay has not been sounded; it is reported as being of fairly good depth. The channel passes north of Platt island (shallow on the south side). At the inner end of the bay are situated Rickley storehouse and landing with 8 feet of water alongside.

Casey point, $5\frac{1}{2}$ miles south-southwesterly of Deseronto, on the east side of the reach, is the north entrance point of Hay bay. The east side of Casey point is clean, but south-southwestward in the direction of Thompson point, a shallow bank extends out half a mile. On it, half that distance out, there is a depth of 4 feet.

Buoy.—A red spar buoy marks the west side of the above-described shoal off Casey point. It bears S. 28° W. and is distant 1,600 feet from the southwest extreme of the point. Vessels proceeding into Hay bay should pass southward of the buoy, at the same time giving it a berth of one-quarter of a mile.

From Thompson point to Bogart wharf which is situated $3\frac{1}{2}$ miles northward on the east side of the reach, the water is good, but the soundings are irregular.

Buoy.—A red spar buoy moored 500 feet off shore, and the same distance northward of Bogart wharf, marks the western side of a shoal which is awash at low water.

Huff wharf is situated on the east side of the reach on the west extreme of a slight point 2,200 feet north-northeastward of Bogart wharf.

Cole wharf is situated on the west side of the reach almost straight across from Huff wharf, 3 miles from Deseronto.

Catalaque shoal is the name given to a shallow bank extending out 1,200 feet from the west side of the reach three-quarters of a mile northward of Cole wharf or two-thirds of a mile southward of Green point which is situated $1\frac{2}{3}$ miles from Deseronto. On it, 600 feet out, there is a depth of one foot.

Buoy.—A black spar buoy marks the east extreme of Catalaque shoal. Vessels should pass close to this buoy on account of three 15-foot spots each lying 1,200 feet off the opposite shore. These three spots are in line, the farthest one north lies just abreast of the spar buoy, and the farthest one south lies 2,300 feet south-southwestward of the former.

Carmen shoal is the name given to a shoal spot which extends in a southwesterly direction from the east shore of the reach, one-third of a mile northeastward of Catalaque shoal. It has 15 feet of water on its southwest end, which is marked with a red spar buoy.

Buoy.—A red spar buoy marks the southwest end of Carmen shoal. It bears S. 30° E. and is distant half a mile from Green point.

Green point is situated $1\frac{3}{4}$ miles south-southwestward of Deseronto. It is the west point of the north end of the reach described in the above paragraphs.

Northward of Green point, bay of Quinte widens out forming an irregular body of water with Deseronto on its northwest side, the entrance of Napanee river on its northeast side, Foresters island in its western part, and the continuation of bay of Quinte westward in the northwest corner.

Grassey point is the most northerly point of Prince Edward county; it is situated half a mile north-northwestward of Green point. There are several cribs and log booms between these two points.

Foresters island, nearly circular in shape, about one-quarter of a mile in size, is situated southwestward of Deseronto, 2,500 feet from the western end of the westernmost wharf. A ridge which at low water becomes almost dry, connects the island with Grassey point, 2,500 feet southwestward.

Buoy.—A gas black buoy, showing an *occulting white* light, is moored in 25 feet of water on the western side of the turning point of the channel opposite Deseronto. It bears N. 28° E. and is distant 1,500 feet from the eastern extremity of the island and also

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N. 76° E. and distant 1,500 feet from the northern extreme of the same island.

Deseronto, a town in Hastings county, is situated on the north side of the most northerly part of bay of Quinte, 12 miles north-northeastward of Picton and 15 miles eastward of Belleville. It is one of the principal commercial and lumber ports on the north shore of lake Ontario between Kingston and Toronto. The most conspicuous marks of the town are the Presbyterian church steeple, the water stand-pipe and the post-office clock dial which is illuminated at night. Its principal industries, on or near the waterfront are terra-cotta works, chemical works, saw-mills, car-works, match factory and **two marine railways**. A spur, about $2\frac{1}{2}$ miles in length, connects the town with the main line of the Canadian National railways between Montreal and Toronto. A ferry is operated between Deseronto and Picton. Smaller boats of the Canada Steamship Lines, Limited, running between Montreal and Toronto, call at this port.

The harbour front is about two-thirds of a mile in length. The depot and warehouse of the Canadian National railways is on the wharf which juts out southward from the foot of Mill street. The principal wharves are the one just mentioned and those extending on each side of it parallel to the shore.

The best water at present is at the western part of the westernmost wharf, where 11 feet may be carried. There are also several wharves jutting out near the foot of 4th avenue, on the east side of the town.

Napanee river entrance is situated less than a mile eastward of Deseronto. The river is narrow and winding through low and marshy land. A channel, 75 feet in width, has been dredged to a least depth of 9 feet as far up as the town of Napanee which is situated $5\frac{1}{2}$ miles northeastward from the entrance of the river. The channel is marked with 14 spar buoys and no lights are maintained.

On account of the sharp turns in the river, schooners have to be towed.

Vessels, other than small craft, should not attempt to proceed up the river without a pilot, except if well acquainted.

Directions from Pleasant point to Deseronto and Napanee.—A vessel proceeding westward of Pleasant point can keep to the middle

Canadian charts Nos. 69 and 77 (see p. 7).

(See datum, p. 5).

Varn. $10^{\circ} 45'$ W.

of Adolphus reach with safety. When abreast of Glen island, 10½ miles from Pleasant point, steer N.W. until Thompson point bears N.N.E., or until the next reach opens up in a north-northeasterly direction, thence steer N.N.E. for the middle of its entrance. Keep in the middle of the reach, passing close to Catalaque shoal black spar buoy, leaving it on the port side. Pass fairly close to Carmen shoal red spar buoy and then steer N. 28° E. until the northern side of Foresters island is abeam. From this point proceed as desired.

If bound for Deseronto steer northward for the western wharf where there is the greatest depth. If bound for Napanee steer N.E. for the entrance of the channel of the river.

If westward bound, alter the course quickly westward, passing northward of the gas buoy, and when passing northward of Foresters island, keep the main shore a little closer aboard.

For a distance of 7 miles westward of Deseronto, bay of Quinte should be navigated with great caution, on account of the channel being irregular and narrow, and having a few ugly rocky shoals.

From Foresters island westward the deep water is nearly midway between the two shores to a point on the south shore, situated nearly 1½ miles from Foresters island. From this point to Telegraph narrows, the deep water is close to the south shore.

A shoal, with 8 feet least water on it, lies 400 yards northward of the south shore, three-quarters of a mile N. 82° E. of Telegraph island light. The shoal is not marked. Vessels should pass southward of it as the shallow bank running out from the north shore extends nearly half-way across the bay in that locality.

Telegraph island.—Light.—This very small island lies 500 feet northward of the south shore, 3¼ miles westward of the eastern extremity of Foresters island. On the north side of the island is erected a white square tower, from which, at a height of 46 feet above the surface of the bay, is exhibited a *white occulting* light visible 8 miles.

Telegraph narrows is the name given to a 115-foot wide dredged cut northward and close to Telegraph island. The channel has been dredged to a least depth of slightly less than 11 feet, and is marked with 4 sets of black and red buoys, each set being about 300 yards from the other.

A red spar buoy is moored in the approach, 400 yards eastward of the eastern end of the dredged cut. This buoy is set almost in the alignment of the south side of the channel and vessels must pass southward of it.

Another red spar buoy is moored in the approach nearly two-thirds of a mile westward of the western end of Telegraph narrows. It marks the shoal bank which extends 600 yards southward from the north shore in that locality.

From the western end of Telegraph narrows the deep water is close to the south shore until abreast of the last-mentioned buoy. From there it gradually crosses over to the north shore and runs north of Northport shoal.

Northport shoal lies a little southward of midway between the two shores, a little over 3 miles westward of Telegraph island light-house. On it is a least depth of 4 feet.

Gas buoy.—The north side of the above shoal is marked by a black spar buoy and also by a *white occulting* gas buoy. The latter bears S. 56° E. and is distant a little over three-quarters of a mile from Trident point. A red spar buoy marks the south edge of the shallower water but is not moored sufficiently far enough south for a vessel passing close to it to clear a 9-foot spot of the same shoal, 400 yards east-southeastward of the buoy. There is also a 9-foot spot 200 yards west-southwestward of the same buoy.

There is a fairly deep water southward of Northport shoal, forming a winding channel. Vessels intending to use this channel should pass fairly close to the south shore and give a good berth to the red spar buoy.

Trident point, the north point of the east end of Big bay, is situated about half-way between Deseronto and Belleville. A shallow spit extends out from this point, half a mile S.W. by W.

Spar buoy.—A red spar buoy marks the southwest extreme of an 8-foot patch detached from the shallow spit running out from Trident point.

Big bay.—Westward of Trident point bay of Quinte widens out to form Big bay. The northern shore of **Big island**, which is 5 miles

long northeastward and southwestward, is situated along the southeast side of Big bay. A shallow bank extends out 300 yards from the northwest shore of Big island, 2 miles southwest of the northeast point of the island. Another shallow bank extends out 500 yards from the same shore two-thirds of a mile farther southwestward of the latter bank. The northeast point of Big island is situated just south of Northport shore.

Big island shoal, half a mile long and narrow, and with one foot of water on it, lies half a mile off Big island $3\frac{1}{2}$ miles from the northeast point of the island.

The locality southwestward of Big island shoal has not been sounded. It contains several islands, the most extensive one being **Huff island**, which form many channels and bays, the largest being **Muscote bay**. The indications are that this part may be shallow and may contain shoals and shallow banks; the same may be said of the channel southeast of Big island.

Hungry bay.—The northeastern part of Big bay is named Hungry bay. The latter has shallow banks extending out as much as two-thirds of a mile. **Salmon island** is situated on its northwest side near the entrance of **Salmon river**, a shallow and narrow stream of water which runs through Shannonville, $1\frac{1}{2}$ miles northeastward.

Lehigh wharf extends 430 feet out from the northwest shore, $1\frac{1}{2}$ miles northeast of the point on the north side of the west entrance of Big bay. Eleven feet may be carried to the outer part of the wharf.

Buoy.—A red spar buoy moored in 15 feet of water marks the southwest extremity of the shallow bank which extends from Salmon island.

Westward of Big bay, bay of Quinte becomes narrow for a distance of about one mile and then widens again, forming another bay 3 miles in length and one mile in width, at the west end of which, on the north side, Belleville is situated.

Point Anne separates the above bay from Big bay. The western part of point Anne is named **Ox point**. Cement works are situated

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on the eastern part of Point Anne, with wharves extending out into 10 feet of water.

Minnie Blakely shoal, with 2 feet of water on it, lies 300 yards S.S.W. of the wharf extending from the above point.

Buoy.—A red gas buoy marks the south extremity of Minnie Blakely shoal.

Horse point, narrow and elongated, is situated south across from the eastern part of point Anne. It is the southeast entrance point of the narrow part of bay of Quinte which separates Big bay from the bay westward.

Ship islet is situated one-quarter of a mile northeast of Horse point.

A shoal, small in extent with one foot of water upon it, lies 300 yards north-northeastward of Ship islet. It bears due South from Minnie Blakely shoal and the distance between them is 700 yards.

The lighthouse in Belleville harbour in line with Massassauga point leads half way between the two shoals.

Buoy.—A black spar buoy moored N. 9° W., distant 450 feet from Ship islet, marks the west side of the above shoal.

Massassauga point is the most northerly point on the south side of the narrow part of bay of Quinte which separates Big bay from the bay westward of it. It bears S. 75° E. and is distant a little less than three miles from the lighthouse in Belleville harbour.

Shoal.—Buoy.—A black spar buoy marks the north side of a one foot spot lying 250 yards off, half a mile westward of Massassauga point.

Cow island lies opposite Belleville 2½ miles westward of Massassauga point and well towards the middle of the bay. Southward of this island the bay is shallow.

Snake island lies W. by N. ½ N. and is distant half a mile from **Ox point**, the southwestern part of point Anne. It is fairly deep close to the south side of the islet. Northward of it the bay is shallow.

Canadian charts Nos. 69 and 77 (*see p. 7*).
(*See datum, p. 5*).
Varn. 10° 15' W.

Belleville, in Hastings county, is situated on the north shore of bay of Quinte, at the mouth of **Moira river**, 9 miles eastward of Trenton and $14\frac{3}{4}$ miles westward of Deseronto. The city, which in 1921 had a population of 12,149, is the most important commercial and industrial point on bay of Quinte. It is a station on the main line of the Canadian Pacific railway and on those of the Canadian National railways between Montreal and Toronto.

It has several church steeples and tall chimneys which show conspicuously. The city hall tower, with its clock dial, also shows up conspicuously.

The southern edge of the shallow bank at the mouth of Moira river is marked with three black spar buoys.

A new wharf, completed in 1914, including a stone approach 200 feet in length, extends out 800 feet southward into the bay from the east entrance point of Moira river. It has a 200-foot easterly extension, at the outer end. A freight shed covers the greater part of this extension. The outer end of the wharf is abreast of the lighthouse. In the bay, a part of the approach to this new wharf has been dredged to a least depth of 9 feet. (See directions, page 92).

The Halton Lumber Company wharf is situated on the west entrance point of Moira river, nearly half a mile northward of the lighthouse.

A cut, the southern end of which is between the outer end of the new wharf and the lighthouse and leading to the Halton Lumber Company wharf, diagonally across the mouth of the river, has been dredged to a least depth of 10 feet. It is marked with three red spar and three black spar buoys. The outer one of the three red buoys marks the southwest end of a row of submerged cribs which extends southwestward from the inner end of the new wharf.

Light.—On a crib, bearing S. 87° W. distant 693 feet from the southwest corner of the new wharf, is erected a white square wood tower, from which, at a height of 38 feet above the surface of the lake, is exhibited a *fixed red* light, visible 8 miles.

Directions for Belleville harbour.—A vessel entering the harbour should steer N. by E. with the southwest corner of the new concrete wharf ahead, passing eastward of and close to the easternmost of the three black spar buoys which mark the edge of the shallow bank

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at the entrance of the harbour. If bound for the wharf keep this course until close to it, then haul eastward to lie along the outer side of the extension.

If bound for Halton wharf haul westward to pass between the concrete wharf and the lighthouse and proceed northwestward up the buoyed channel.

Bay of Quinte bridge, across from Belleville to **Rossmore**, a small village on the south side, has a draw span near the latter place. The centre of the draw is 195 feet from the south shore, with a channel 100 feet in width on both the north and south sides.

Lights.—A *fixed white* light is shown on the south side of the southern opening and another *fixed white* light on the northern side of the north opening. Two *fixed green* lights are also shown from each end of the draw when it is open. A vessel approaching from eastward, or from westward, will see, when the bridge is open, one white light on the left, two green lights in the middle and one white light on the right side. Pass between a white and a green light as desired. A red light showing instead of the green lights means that the bridge is closed and that vessels cannot pass.

Directions from Deseronto to Belleville.—From the wharves at Deseronto steer to pass Foresters island with the north shore of bay of Quinte a little closer aboard, then proceed in mid-channel until abreast of the two points, one on each side, each with a wharf, $1\frac{1}{2}$ miles southwestward of the east side of Foresters island. The vessel should then be 300 yards from both shores. From here follow the south shore, at the same time diminishing the distance from it to 250 yards in about one mile, or, in the day time, until the buoys marking the south side of Telegraph narrows channel are brought in line, or at night until Northport shoal gas buoy is brought in line with Telegraph island light, bearing S, 86° W., thus avoiding an 8-foot spot situated three-quarters of a mile from the light and bearing N. 82° E. from it. Then alter the course northward for the buoyed channel, the axis of which bears S. 88° W. and is only 225 feet northward of the lighthouse. Immediately after coming out of the buoyed channel steer S. 66° W. to keep the same distance from the south shore and to pass midway between it and the red spar buoy two-thirds of a mile distant. When abreast of the latter buoy head

Canadian charts Nos. 69 and 77 (*see* p. 7).

(*See* datum, p. 5).

Varn. 10° $15'$ W.

quickly on Northern shoal gas buoy which should bear West and be $2\frac{1}{2}$ miles distant. Having done this, alter the course one-quarter of a point northward and keep that course until abreast of the gas buoy, passing 300 yards northward of it.

From the latter position steer S. 86° W. for a distance of $1\frac{1}{2}$ miles passing 300 yards southward of Trident point red spar buoy. Thence steer N. 75° W., 3 miles with Minnie Blakely shoal gas buoy ahead. On this course, Belleville light, which should show slightly southward of the gas buoy, should be picked up. When near the gas buoy alter the course to pass close south of it. Having passed the gas buoy bring it immediately over the stern and steer with Belleville light ahead bearing N. 78° W., for a distance of $2\frac{1}{2}$ miles or until nearly abreast of Cow island, and then proceed as desired.

From the latter position the three black spar buoys outside of Belleville harbour, two-thirds of a mile distant, should be seen over the port bow. If bound for Belleville alter the course sufficiently southward so that the vessel has ample space to make a turn northward and proceed as indicated in the direction for Belleville harbour.

If bound westward steer S. 84° W. for the swing span of bay of Quinte bridge close to the south shore, $1\frac{1}{4}$ miles distant.

From bay of Quinte bridge to Nigger narrows, a distance of 5 miles west-southwestward, bay of Quinte varies in width from a little more than half a mile to a little more than three-quarters of a mile and has depths of 14 to 16 feet.

A shoal, isolated, with 3 feet of water over it, lies two-thirds of a mile N.N.E. of **Anderson wharf** which is situated on the south side $2\frac{1}{4}$ miles southwestward of bay of Quinte drawbridge. A black spar buoy marks the northern side of the shoal.

Another shoal, with 10 feet of water upon it, lies 600 yards N. 28° E. of **Rednersville wharf**, which is situated on the south side $3\frac{3}{4}$ miles southwestward of bay of Quinte draw bridge. The shoal is not buoyed.

Nigger island, 800 feet in length northeasterly and southwesterly and 350 feet in width, lies closer to the northern shore, 5 miles westward of bay of Quinte bridge, Belleville, and 3 miles eastward of Trenton. A shallow bank extends in a southwesterly

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direction almost fully across from the island to **Potter point** of the southern shore, leaving a narrow channel described below, under the heading of **Nigger narrows**. A bank with a greatest depth of 10 feet, connects the island with the northern shore of the bay. The winding channel northward of **Nigger island** should not be attempted by other than small craft, which should pass fairly close to the northern end of the island.

Light.—On a pier lying in 8 feet of water on the southeast side and near the southwest extremity of the bank which extends southwestward from **Nigger island**, is erected a square wood tower, from which at a height of 27 feet above the bay, is exhibited an *occulting white* light, visible 10 miles. The pier which lies 625 yards S. 48° W. of the south point of **Nigger island** is only 15 yards northwestward of the northern side of the channel. The light is not watched. It bears S. 76° W. distant 5½ miles from the swing span of bay of Quinte bridge, Belleville, and N. 52° E. distant 2.6 miles from **Onderdonk point lighthouse**.

Nigger narrows.—The buoyed channel between **Nigger island lighthouse** and **Potter point** has a least width of 350 feet. Its least depth is 12 feet. The distance from the lighthouse to **Potter point** is 300 yards.

Buoys.—In addition to the lighthouse, which, as already mentioned, is situated 15 yards northwest of the northwest side of the channel, the channel is marked with two red and two black spar buoys.

A red spar buoy marking the northwestern side of the channel is moored in 10 feet of water, 350 yards N. 70° E. of the lighthouse. Another black spar buoy also marking the northwest side of the channel is moored 100 yards southwestward of the same lighthouse on the southwest extreme of the bank which extends from **Nigger island**.

The southern side of the channel is marked with two black spar buoys; one on the edge of the shallow bank which extends from the shore westward of **Potter point**, bearing S. 60° W. and distant 700 yards from **Nigger island lighthouse**; another on the edge of the shallow bank which extends from the shore eastward of **Potter point**, bearing N. 84° E. and distant 700 yards from the same lighthouse.

The greater part of bay of Quinte southwestward of Nigger narrows is shallow. It has two dredged cuts leading to Trenton, one from eastward and the other from southward from the eastern end of Murray canal. From the narrows to Murray canal the channel is along the southern side of the bay.

Way point is situated on the southern side of bay of Quinte, three-quarters of a mile S.W. by S. of Nigger island lighthouse. A shallow spit extends one-third of a mile W.N.W. from the point.

A shoal, small in extent, with 10 feet least water upon it, lies 800 feet off, half a mile southwestward of Way point. It bears S. 82° W. and is distant half a mile from Way point.

The northern edge of both the above shoal and the spit extending from Way point are on the line of Nigger island lighthouse to Onderdonk lighthouse, 0.9 and 1.25 miles respectively from the former. Vessels should keep well northward of this line.

Onderdonk point is situated on the southern shore across from Trenton, or 2½ miles southwestward of Nigger island lighthouse. The point at the lighthouse is clean but the shallow bank which extends eastward from Indian island leaves between it and the shore at Onderdonk point a channel only 500 feet in width. Westward of the point the channel becomes gradually wider. For buoy off Onderdonk point see paragraph following description of Indian island.

Light.—On Onderdonk point, close to the shore, is erected a white square wood tower, from which, at a height of 34 feet above the lake, is exhibited a *white fixed* light visible 4 miles. The light bears S. 52° W. and is distant 2.57 miles from Nigger island lighthouse, and N. 70° E. distant 2.06 miles from the lighthouse at the eastern end of Murray canal. It also bears S. 44° E., and is distant 1.9 miles from Trenton front range light on the west entrance point of the Trent river, Trenton.

Indian island, 400 yards in length northward and southward and 235 yards in width, is situated 430 yards eastward of Dark channel (see page 100) or a little less than a mile northeast of Murray canal east entrance, and nearly 1½ miles west of Onderdonk point lighthouse. A shallow bank, about twice the width of the island, extends 1½ miles eastward from the east side of Indian island, gradually

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approaching the southern shore. Off Onderdonk point lighthouse the channel between the east end of the bank and the shore is only 500 feet wide. On this bank, half a mile east-northeastward of Indian island, there is a depth of one foot. On the eastern end of the bank there is a depth of 5 feet.

Buoys.—A red spar buoy moored 500 feet north of Onderdonk point lighthouse marks the southeast side of the eastern extreme of Indian island shallow bank described above.

Another red spar buoy is moored in 11 feet of water, one-third of a mile south of the one foot spot on Indian island bank. It bears S. 76° W. and is distant 0.8 mile from Onderdonk point lighthouse.

A shoal, small in extent with 7 feet least water on it, lies N. 15° E., distant half a mile from Onderdonk point.

Murray canal, in the southeast corner of Northumberland county, connects bay of Quinte with Presqu'ile bay. Its eastern end is at **Twelve O'clock point**, the southwest extreme of bay of Quinte. The canal is straight, bears S. 76° W. and has no locks. It is $4\frac{1}{2}$ miles long from pierhead to pierhead or about 7 miles including the cuts beyond the pierheads at each end. Between the banks of the canal the width is 120 feet, but the bottom of the cut is only 80 feet wide. It has a least depth of 9 feet at the Standard low water datum adopted by Canada and the United States, which is 243 feet above mean tide New York, N.Y. This datum is nearly extreme low water; the average mean summer level of lake Ontario is usually one to two feet above this. (See datum, p. 5).

Bridges.—There are three highway swing bridges and one railway swing bridge crossing the canal, all of which are passed to the south of the swings which are somewhat to the northward of the axis of the canal. They are Carrying Place bridge, 0.8 miles; Canadian National railway bridge, 1.03 miles; Smithfield bridge, 2.1 miles, and Lovatt bridge, 3.4 miles from the lighthouse on the pierhead at the east end of the canal. They open on signals from vessels. The distance between the lighthouses at each end is 4.45 miles.

Lights.—On the north pier, at the eastern entrance of Murray canal, 30 feet from the end, is erected a white circular column rising

Canadian charts Nos. 69 and 77 (see p. 7).

(See datum, p. 5).

Varn. $9^{\circ} 30' W.$

from an hexagonal base, from which, at a height of 27 feet above the surface of the bay, is exhibited a *fixed white* light, visible 5 miles.

For light on western entrance of the canal see page 34.

From the middle of the above-named swing bridges is shown a *fixed red* or a *fixed white* light. A red light means that the bridge is closed; a white light means that the swing span is open and that a vessel may pass.

Buoy.—A red spar buoy is moored on the northern side of the dredged cut leading to the eastern entrance of the canal. The buoy is about one-third of a mile from the lighthouse on the pierhead and nearly on the alignment of the northern side of the canal.

Trenton, a town in Hastings county, is situated 9 miles westward of Belleville, on the northern shore of bay of Quinte, at the mouth of Trent river, about 2 miles from the western extremity of the bay. In 1921 it had a population of 5,890. It is a station on the main lines of the Canadian Pacific and the Canadian National railways between Montreal and Toronto. A branch line of the latter, running between Maynooth and Howland and Picton, passes through Trenton. Near its mouth the Trent river is crossed by a highway bridge with swing span, the farthest bridge down stream and crossing at Dundas street, the Canadian National railways bridge also with swing span, 0.27 miles above the latter, and the Canadian Pacific railway bridge, stationary, with 46 feet clearance above low water, 0.7 miles above the highway bridge.

The Grand Trunk railway bridge crosses the river at Trenton junction, 1.55 miles above the highway bridge at the mouth of the river, or immediately below the first lock of the Trent valley canal. It is a stationary bridge having a clearance of 33 feet above low water.

The principal wharves are situated below the highway bridge. Pollys wharf with 200 feet frontage along the western side of the Trent river, is situated immediately southward of the highway bridge; 12 feet may be carried to this wharf. Gothard coal wharf is contiguous to and at right angles to the latter, westward; 8 feet may be carried to the eastern part of the wharf.

The Trenton Cooperage Mills Company wharf is situated 165 feet southward of Pollys and Gothard wharves. The outer end of the

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wharf is 120 feet long. The approach to it has been dredged to a least depth of 10 feet. In the slip between the Trenton Cooperage Mills Company wharf and that of Gothard coal dock, is situated a **marine railway** which can handle vessels 125 feet in length.

Gill and Fortune wharf, with 530 feet frontage along the eastern side of the river, is situated immediately southward of the highway bridge; 11 feet may be carried to the wharf.

Gilmour and Company wharves are situated on the eastern entrance point of the Trent river, about one-third of a mile south-eastward of the highway bridge. They consist of several piers covering a frontage of 2,000 feet along the east side of the river. About 12 feet may be carried to their outer ends.

The least depth is 13 feet for a width of about 600 feet along the eastern side of the mouth of the Trent river from Gilmour and Company wharves to the highway bridge, and for the full width of the river near and southward of the highway bridge. Southward of the Cold Storage wharf, on the western side, the mouth of the river is shallow.

Dredged cuts.—Trenton is reached through two cuts which have been dredged out of the shallow flats which extend nearly fully across bay of Quinte in that locality.

Eastern channel.—Range lights, gas buoy, spar buoys.—The eastern crooked cut, 150 feet in width, about $2\frac{1}{2}$ miles in length and dredged to a least depth of 13 feet, runs 450 feet south of **Baker island** which is situated 400 yards south of **Myer point**, about 2 miles eastward of Trenton. The eastern end of the dredged cut bears S. 66° W. and is distant one mile from Nigger island lighthouse. The eastern part of the cut, 4,374 feet long and bearing S. 99° W., is marked with 4 ^{red} ~~black~~ spar buoys on the northern side and with a black spar on the southern side at the western turn. Between this turn and the next, 3,715 feet and bearing S. 77° W., there are two red spar buoys on the northern side, a red gas buoy on the northern side of the turn and a black spar buoy on the southern side of the turn, opposite the gas buoy.

The next part of the cut, 3,012 feet in length and bearing N. 70° W., is marked with one red spar buoy moored on the northern side, half way to the next turn and a red spar and a black spar buoy at

Canadian charts Nos. 69 and 77 (see p. 7).

(See datum, p. 5).

Varn. $9^{\circ} 30'$ W.

the turn; a set of range lights erected on the west side of the mouth of the river marks the axis of this part of the dredged channel.

The western part of the channel, 1,900 feet in length and bearing N. 54° W., is marked with two red spar buoys. The northernmost red spar buoy is moored 200 yards south of Gilmour and Company wharves.

Range lights.—The front fixed red light is shown from in front of a white diamond-shaped day-mark at a height of 20 feet above the lake, and is visible 2 miles. The rear red fixed light is shown in a similar way at a height of 42 feet above the lake and is visible 2 miles in clear weather. The rear light bears N. 70° W. and is distant 520 feet from the front light.

The lights in one, bearing N. 70° W., lead in from the eastward through the dredged channel for a distance of 3,012 feet from a turn in the channel about one mile southeastward of Gilmour and Company wharves to a turn in the channel about half a mile southwestward of the same wharves.

Dark channel.—This channel, 200 feet in width, 2 miles in length and bearing N. 22° E., leads on a straight line from Murray canal to the Trent river entrance. The dredged cut with a least depth of 8 feet begins 300 yards eastward of the lighthouse of Murray canal eastern entrance and leads in a straight line to Gilmour and Company wharves. The west side of the northern part of the channel is marked with four red spar buoys. One hundred and fifty yards eastward of midway between the two southernmost buoys or three-quarters of a mile southward of Gilmour and Company wharves, there is a depth of one foot.

Directions from Belleville to Trenton and to Murray Canal.—From bay of Quinte bridge steer S. 76° W. with Nigger island lighthouse ahead. Keep this course for a distance of $4\frac{1}{2}$ miles, when the vessel should be about half a mile eastward of Nigger island, and should have the black spar buoy off the northeast side of Potter point slightly over the port bow, distant half a mile. Haul a little northward to give a slightly wider berth to that buoy, then steer S. 67° W. through the buoyed channel, with the black spar buoy at the

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western end of the channel over the port bow, to pass not more than 250 feet southeastward of Nigger island lighthouse. When abreast of the lighthouse, haul northward to pass close to the red spar buoy moored 100 yards southwestward of the lighthouse, and then steer West 3 cables, or until abreast of the black spar buoy off the west side of Potter point, on the southern side of the channel, to keep away from the shallow water extending from the northwest side of the point. If bound for Murray canal steer S. 50° W. with Onderdonk lighthouse 2½ miles distant slightly over the port bow and Nigger island lighthouse over the port quarters. Pass midway between Onderdonk and the black spar buoy off it, abreast of the lighthouse on the same point, thence steer S. 66° W. for the red spar buoy marking the northern side of the eastern end of the dredged cut leading into the canal, 1½ miles distant.

If bound for Trenton from the position at the west end of Nigger Narrows, steer about S. 60° W. for the east end of the buoyed channel, about two-thirds of a mile distant, leading into the Trent river and proceed through the channel, which, although being crooked is well marked with red buoys along the north side and one black spar buoy at each turn. (See Eastern channel, page 99). Having passed the last red spar buoy which is moored close to and south of Gilmour and Company wharves, proceed northward along the east side of the mouth of the river until close to the highway bridge.

TRENT CANAL, fully described on the following pages from extracts of publications of the Department of Railways and Canals, will, when completed, form an inland route from Trenton on bay of Quinte to Honey harbour on Georgian bay. It is 236 statute miles long, and will have 8 feet 4 inches of water throughout over the sills of its 46 locks.

At present 8 feet 4 inches are available from Trenton to Peterborough for vessels 175 feet in length; 6 feet from Peterborough to Washago for vessels 134 feet in length; from Washago to Georgian bay, the canal, in its present state of construction, is available only for launches not over 35 feet in length by using the marine railways at Big Chute and Ragged Rapids and the lock at Port Severn.

TRENT CANAL

The term "Trent canal" is applied to a series of water stretches, which do, however, form a connected system of navigation, and which in their present condition, are efficient only for local use. By various works this local use has been extended, and by others, now in progress and contemplation, this will become a through route between lake Ontario and lake Huron.

The series is composed of a chain of lakes and rivers, extending from Trenton at the mouth of the Trent river on the bay of Quinte, lake Ontario, to Honey harbour about 10 miles north of Midland on Georgian bay, lake Huron.

Many years ago the utilizing of these waters was projected for the purpose of through water communication between lake Huron and lake Ontario.

The course, as originally contemplated and modified, is as follows:—

Through the Trent river, Rice lake, the Otonabee river and lakes Clear, Stony, Lovesick, Deer, Buckhorn, Chemong, Pigeon, Sturgeon and Cameron to lake Balsam, the summit water, about 155 miles from Trenton; from lake Balsam by a canal and the Talbot river to lake Simcoe.

From lake Simcoe the route is through lake Couchiching and down the Severn river to Gloucester pool, leaving Gloucester pool by the Go-Home lakes and South Honey harbour and entering the Georgian bay at Skylark rock between Beausoleil and Minnicoganashene islands. There will be 8 feet 4 inches of water on the sills throughout. Another passage between Gloucester pool and Georgian bay is provided by a small lock at Fort Severn, with 6 feet of water on the sill.

The full execution of the scheme, commenced by the Imperial Government in 1837, was deferred. By certain works, however, below specified, sections of these waters have been made practicable for navigation, and the whole scheme is now being carried out. A branch of the main route, extending from Sturgeon lake south, affords communication with the town of Lindsay, and through lake Seugog, to Port Perry, a distance of approximately 174 miles from Trenton.

The works by which the Trent navigation has been improved to date comprise short canals with locks as follows: Between Trenton and Frankford, 6 locks; Glen Ross; between Glen Ross and Campbellford, 5 locks, including two locks in flight at Ranney falls; between Campbellford and Healey falls, 3 locks; at Healey falls, 2 locks in flight; Hastings, Peterborough; Peterborough to Lakefield, 7 locks, one being a hydraulic lift; one at Young Point, two at Burleigh Falls, one at Lovesick, Buckhorn, Bobcaygeon, two at Fenelon Falls, one at Rosedale, and six locks between Balsam and Simcoe lakes, one being a hydraulic lift; also lock and dam at Lindsay; also lock and dam at Port Severn, on Georgian bay; also 6 dams between Trenton and Frankford, one at Glen Ross, three between Glen Ross and Campbellford, one above Campbellford, one at Middle falls, Healey falls, Hastings, and Peterborough; Peterborough to Lakefield, 6; one at Young Point, Burleigh, Lovesick, Buckhorn, Bobcaygeon, Fenelon Falls, Rosedale, and three between Balsam and Simcoe lakes.

Bridges also have been built at many of the locks and other places.

For convenience the canal may be divided into the following divisions, the lengths being given:—

ONTARIO-RICE LAKE DIVISION

Embracing the canal and river navigation between Trenton, on the bay of Quinte, to Rice lake, 56 miles.

The all-river route from Trenton, on the bay of Quinte, to Rice lake was fully decided upon by the Government during the session of 1907, the work of construction was begun that fall and is now complete. The improvement is carried out on the principle of damming the river at suitable points by means of dams, and connecting the pools thus created by means of locks and short stretches of canal. The locks on this division are 175 feet long, 33 feet wide, with 8 feet 4 inches of water on the sills. In the reaches there will be a minimum depth of 9 feet of water. Rice lake is 369 feet above low water level of lake Ontario, which height will be overcome by 18 locks.

At Hastings are a concrete lock, replacing the old masonry lock, and a concrete dam, replacing the old timber structure which formerly existed at that point; these maintain navigation on the Trent river, Rice lake and the Otonabee river to Peterborough, a distance of about 38 miles.

PETERBOROUGH-RICE LAKE DIVISION

Embracing that stretch of river and lake navigation from the lower end of Rice lake to Peterborough, 32 miles.

This division is navigable with a minimum depth of 8 feet 4 inches.

At Peterborough, 89 miles from Trenton, is a masonry lock and a concrete dam which maintain navigation through Little lake to lock No. 6 of the Peterborough-Lakefield division, a distance of about three-quarters of a mile.

PETERBOROUGH-LAKEFIELD DIVISION

Embracing that stretch of river and canal navigation from Little lake at Peterborough to Lakefield, 10 miles.

Construction is completed and canal in operation with a minimum depth of 6 feet for navigation.

From Peterborough to Lakefield, navigation is maintained on the Otonabee river by a series of concrete locks and timber dams, as follows:—

Leaving Little lake through lock No. 6, in a distance of about half a mile, the hydraulic lift lock is reached, where there is a lift of 65 feet into a reach which extends to lock No. 5, about 5 miles from Peterborough, the last mile only of this reach being in the river; from here to Lakefield, locks 5, 4, 3, 2, and 1, with their respective dams, give navigation to Lakefield, about 10 miles from Peterborough, or 99 miles from Trenton, and thence 5 miles further to Young Point.

KAWARTHA LAKES DIVISION

Embracing that stretch of lake and river navigation from Lakefield to the entrance to the canal on the west shore of Balsam lake—62 miles, navigable with a minimum depth of 6 feet; also in this division may be included the Lindsay branch which embraces the Seugog lake and river from main channel on Sturgeon lake to Port Perry, the distance being about 30 miles, not included in the total 62 miles above mentioned. A new lock and dam at Lindsay on this branch have recently been built.

The Port Severn section includes the impounding and regulating dams at Port Severn which maintain the Gloucester pool level. A small lock there provides for small craft an additional route between Gloucester pool and Georgian bay.

HOLLAND RIVER DIVISION

This contemplated the canalization of the Holland river between lake Simcoe and Newmarket, 12.3 miles. It has not been completed, and work on it was discontinued in December, 1911.

LOCKS ON TRENT CANAL

The following is a list of locks now in use, with their dimensions, in order of location, from Hastings to Gamebridge on lake Simcoe.

		Length between Hollow Quoins	Width	Depth on Sill	Lift
		Ft.	Ft.	Ft.	Ft.
1	Lock at Trenton, No. 1, Ontario—Rice Lake Division.....	175	33	8 4 in.	20
1	" No. 2, " " " ".....	175	33	8 4 in.	20-07
1	" No. 3, Glen Miller, " " " ".....	175	33	8 4 in.	26-90
1	" No. 4, " " " ".....	175	33	8 4 in.	18
1	" No. 5, " " " ".....	175	33	8 4 in.	18-12
1	" No. 6, Frankford, " " " ".....	175	33	8 4 in.	16-11
1	" No. 7, Glen Ross, " " " ".....	175	33	8 4 in.	9-07
1	" No. 8, " " " ".....	175	33	8 4 in.	20-4
1	" No. 9, " " " ".....	175	33	8 4 in.	16
1	" No. 10, " " " ".....	175	33	8 4 in.	24
2	Nos. 11 and 12, in } " " " ".....	175	33	8 4 in.	24
	flight, Ranney falls } " " " ".....	175	33	8 4 in.	24
1	" No. 13, " " " ".....	175	33	8 4 in.	23
1	" No. 14, " " " ".....	175	33	8 4 in.	25
1	" No. 15, " " " ".....	175	33	8 4 in.	22
2	Nos. 16 and 17, in } " " " ".....	175	33	8 4 in.	27
	flight, Healey falls } " " " ".....	175	33	8 4 in.	27
1	" at Hastings.....	175	33	8 4 in.	9
1	" at Peterborough.....	134	33	6	8
1	" No. 6, Peterborough—Lakefield division.....	142	33	6	12
1	" at Peterborough, hydraulic lift lock No. 1.....	149	33	6	65
1	" No. 5, Peterborough—Lakefield division.....	142	33	6	14
1	" No. 4, " " " ".....	142	33	6	12
1	" No. 3, " " " ".....	142	33	6	12
1	" No. 2, " " " ".....	142	33	6	10
1	" No. 1, " " " ".....	142	33	6	16
1	" at Young Point.....	134	33	6	6
2	" at Burleigh, each 11½ feet.....	Upper 134 Lower 150	33	6	23
1	" at Lovesick.....	134	33	6	4
1	" at Buckhorn.....	134	33	6	9
1	" at Buchaygon.....	134	33	6	7
2	" at Fenelon Falls, each 12 feet.....	Upper 134 Lower 150	33	6	24
1	" at Rosedale.....	175	33	8 4 in.	4
1	" at Kirkfield, hydraulic lift lock No. 2.....	140	33	6	50-44
1	" No. 1, Simcoe—Balsam Lake Division.....	142	33	6	21
1	" No. 2, " " " ".....	142	33	6	14
1	" No. 3, " " " ".....	142	33	6	14
1	" No. 4, " " " ".....	142	33	6	14
1	" No. 5, " " " ".....	142	33	6	11
41	" at Lindsay, Scugog Branch.....	142	33	6	6-5
1	" at Port Severn, Severn division.....	100	25	6	12

At Young Point, a masonry lock and timber dam maintain navigation through Clear and Stony lakes to Burleigh, a distance of about 9 miles.

At Burleigh, a masonry lock of two lifts and concrete dam maintain navigation through Lovesick lake, about 2 miles, to Lovesick. A new concrete dam has recently been completed at Burleigh.

At Lovesick, a masonry lock and timber dam maintain navigation through Deer bay for about 5 miles to Buckhorn.

At Buckhorn, a masonry lock and new concrete dam maintain navigation for about $16\frac{1}{2}$ miles through Buckhorn and Pigeon lakes to Bobcaygeon, 136 miles from Trenton, and also as branches, maintain navigation from Buckhorn lake through Chemong lake to Bridgenorth, about 8 miles, and in the Pigeon river from Pigeon lake to Onemee, about 10 miles.

At Bobcaygeon, a masonry lock and 2 dams, one being recently rebuilt of concrete and the other a timber one, maintain navigation through Sturgeon lake and Fenelon river, a distance of about $14\frac{1}{2}$ miles to Fenelon Falls.

At Fenelon Falls are a short canal, a masonry lock of 2 lifts and a new concrete dam which maintain navigation across Cameron lakes to Rosedale, a distance of about $3\frac{1}{2}$ miles, to a new concrete lock of the same dimensions as those of the Ontario-Rice lake division.

At Rosedale, the new concrete lock and dam maintain navigation on Balsam lake, the summit level of the canal, which extends from Rosedale to the hydraulic lock at Kirkfield, a distance of 12 miles; half of this distance is through a canal connecting Balsam lake with the lock, which is about 166 miles from Trenton.

SIMCOE-BALSAM LAKE DIVISION

Extends from Balsam lake to Gamebridge on lake Simcoe—18.2 miles.

Construction is completed and the canal is in operation, with a minimum depth of 6 feet.

At the Kirkfield hydraulic lock there is a drop of 50.44 feet from the summit level. From this point to Gamebridge on lake Simcoe, 179 miles from Trenton, the route consists of canal and river reaches maintained by damming the Talbot river. There are 5 new concrete locks numbered 1, 2, 3, 4 and 5.

SEVERN RIVER DIVISION

This division embraces the western portion of the system extending from lake Simcoe to the Georgian bay. It comprises three main

sections, Nos. 1, 2 and 3, and the Port Severn section. Except for section 1, these are all in course of construction.

Section 3 extends from lake Couchiching to a point $1\frac{3}{4}$ miles above Ragged Rapids, a distance of 15.3 miles. The dams at the various outlets of lake Couchiching will be remodelled so as to provide more efficient regulation. A cut 4 miles long with a lock of 20 feet drop at its northern end will connect deep water in lake Couchiching with the Severn river just below Severn bridge. From this point the route follows the Severn river through Sparrow lake to the lower end of the section without lockage.

Section 2, 11.6 miles long, extends to Big Chute. Except for one-quarter of a mile of cut near the east end of the section, the route follows the river bed throughout. The dam and power plant at Ragged Rapids have been replaced by a new dam, power plant and lock of 47 feet drop two miles further down the river. This is the only lock on this section. A regulating dam has been constructed on Pretty channel.

Section 1, 16.8 miles long, extends to deep water in Georgian bay west of Beausoleil island. Between Big Chute and Gloucester pool the route is east of the river, and will consist of two locks of 29 feet drop each, connected by an artificial lake. The Gloucester pool level extends through the Go-Home lakes to the south Honey harbour lock where, with a drop of about 14.5 feet, the canal will enter the Georgian bay level.

For **rules and regulations** see "Rules and Regulations for guidance and observance of those using and operating the canals of the Dominion of Canada," published by the Department of Railways and Canals, Ottawa.

RULES

FOR

NAVIGATING THE GREAT LAKES

Including Georgian bay, their connecting and tributary waters and the St. Lawrence river as far East as the lower exit of the Lachine canal and the Victoria bridge at Montreal.

For "International Rules of the Road" applicable to the St. Lawrence river below Montreal, see p. 126.

Preliminary

In the following rules every steam vessel which is under sail, and not under steam is to be considered a sailing vessel; and every vessel under steam, whether under sail or not, is to be considered a steam vessel.

The word *steam vessel* and *steamer* shall include any vessel propelled by machinery.

A vessel is *under way* within the meaning of these rules when she is not at anchor, or made fast to the shore or aground.

LIGHTS

Rule. 1. The lights mentioned in the following rules and no others shall be carried in all weathers from sunset to sunrise. The word visible in these rules when applied to lights shall mean visible on a dark night with a clear atmosphere.

Rule 2. Except in the case hereinafter expressly provided for, a steam vessel when under way shall carry:

(a) On or in front of the foremast, or if a vessel without a foremast, then in the forepart of the vessel, at a height above the hull of not less than twenty feet, and if the beam of the vessel exceeds twenty feet, then at a height above the hull not less than such beam, so, however, that such height need not exceed forty feet, a bright white light so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw

the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side, and of such character as to be visible at a distance of at least five miles.

(b) On the starboard side, a green light, so constructed as to throw an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side, and of such a character as to be visible at a distance of at least two miles.

(c) On the port side, a red light, so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side, and of such a character as to be visible at a distance of at least two miles.

(d) The said green and red lights shall be fitted with inboard screens projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

(e) A steamer of over one hundred and fifty feet register length shall also carry when under way an additional bright light similar in construction to that mentioned in subdivision (a), so fixed as to throw the light all around the horizon and of such character as to be visible at a distance of at least three miles. Such additional light shall be placed in line with the keel at least fifteen feet higher from the deck and more than seventy-five feet abaft the light mentioned in subdivision (a).

Rule 3. A steam vessel having a tow other than a raft shall in addition to the forward bright light mentioned in subdivision (a) of rule two carry in a vertical line not less than six feet above or below that light a second bright light of the same construction and character and fixed and carried in the same manner as the forward bright light mentioned in said subdivision (a) of rule two. Such steamer shall also carry a small bright light abaft the funnel or after mast for the tow to steer by, but such light shall not be visible forward of the beam.

Rule 4. A steam vessel having a raft in tow shall, instead of the forward lights mentioned in rule three, carry on or in front of the foremast, or if a vessel without a foremast then in the fore part of the vessel, at a height above the hull of not less than twenty feet, and if the beam of the vessel exceeds twenty feet, then at a height above the hull not less than such beam, so however that such height need not exceed forty feet, two bright lights in a horizontal line

athwartships and not less than eight feet apart, each so fixed as to throw the light all around the horizon and of such character as to be visible at a distance of at least five miles. Such steamer shall also carry the small bright steering light aft, of the character and fixed as required in rule three.

Rule 5. A sailing vessel under way and any vessel being towed shall carry the side light mentioned in rule two.

A vessel in tow shall also carry a small bright light aft, but such light shall not be visible forward of the beam.

Rule 6. Whenever, as in the case of small vessels under way during bad weather, the green and red side lights cannot be fixed, these lights shall be kept at hand lighted and ready for use, and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side, nor the red light on the starboard side, nor, if practicable, more than two points abaft the beam on their respective sides. To make the use of these portable lights more certain and easy, they shall each be painted outside with the colour of the light they respectively contain, and shall be provided with suitable screens.

Rule 7. A vessel under one hundred and fifty feet register length, when at anchor, shall carry forward, where it can best be seen, but at a height not exceeding twenty feet above the hull a white light in a lantern constructed so as to show a clear, uniform, and unbroken light, visible all around the horizon, at a distance of at least one mile.

A vessel of one hundred and fifty feet or upward in register length, when at anchor, shall carry in the forward part of the vessel, at a height of not less than twenty and not exceeding forty feet above the hull, one such light, and at or near the stern of the vessel, and at such a height that it shall be not less than fifteen feet lower than the forward light, another such light.

Rule 8. Open boats shall not be obliged to carry the side lights required for other vessels, but shall, if they do not carry such lights, carry a lantern having a green slide on one side and a red slide on the other side; and on the approach of or to other vessels, such lantern shall be exhibited in sufficient time to prevent collision, and in such a manner that the green light shall not be seen on the port side, nor the red light on the starboard side. Open boats, when at anchor or stationary, shall exhibit a bright white light. They shall not,

however, be prevented from using a flare-up in addition if considered expedient.

Rule 9. Sailing vessels shall at all times, on the approach of any steamer during the night time, show a lighted torch upon that point or quarter to which such steamer shall be approaching.

Lights for tugs under 30 tons register (net) whose principal business is harbour towing

Rule 10. Tugs under 30 tons register (net) whose principal business is harbour towing, shall carry the red and green side lights carried by other steamers; and, at the foremast head, or, if the steamer has no foremast, then on top of the pilot house, a white light so constructed as to show a uniform and unbroken light over an arc of the horizon of 20 points of the compass, and so fixed as to throw the light 10 points on each side of the vessel, namely, from right ahead to 2 points abaft the beam on either side, and of such a character as to be visible at a distance of at least 3 miles; and *when towing, except when towing a raft*, shall carry an additional white light of same character and construction as the headlight, and hung not less than 3 feet vertically above or below the headlight.

When towing a raft, the two headlights shall be carried in a horizontal line athwartships not less than 4 feet apart, each so fixed as to throw the light all around the horizon, and of such a character as to be visible at a distance of at least 3 miles.

Lights to be carried by ferryboats

Rule 11. Ferryboats propelled by steam or machinery shall carry the white light or lights and the coloured side lights required by these rules to be carried on steam vessels, except that *double-end ferryboats* shall carry a central range of clear, bright, white lights, showing all around the horizon, placed at equal altitudes forward and aft, also on the starboard side a green light, and on the port side a red light, of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least 2 miles, and so constructed as to show a uniform and unbroken light over an arc of the horizon of 10 points of the compass, and so fixed as to throw the light from right ahead to 2 points abaft the beam on their respective sides.

The green and red lights shall be fitted with inboard screens projecting at least 3 feet forward from the lights, so as to prevent them from being seen across the bow.

Lights for canal boats in tow of steam vessels

Rule 12. Canal boats when in tow of steam vessels shall carry lights as follows:—

Canal boats when *towed astern of steam vessels and towed singly or tandem* shall each carry a green light on the starboard side, a red light on the port side, and a small bright white light aft.

When canal boats are *towed at a hawser in one or more tiers*, two or more abreast, the boat on the starboard side of each tier shall carry a green light on her starboard side, and the boat on the port side of each tier shall carry a red light on her port side, and each of the outside boats in the last tier shall also carry a small bright white light aft.

When a canal boat is *towed alongside* and on the starboard side of a steamer, the boat towed shall carry a green light on the starboard side; and when towed on the port side of a steamer, the boat towed shall carry a red light on the port side.

When *two canal boats are towed alongside of a steamer*, one on the starboard and one on the port side, the starboard boat shall carry a green light on the starboard side and the port boat shall carry a red light on the port side.

The *coloured side lights* referred to in these rules for canal boats in tow of steam vessels shall be fitted with inboard screens, so as to prevent them from being seen across the bow, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least 2 miles, and so constructed as to show a uniform and unbroken light over an arc of the horizon of 10 points of the compass, and so fixed as to throw the light from right ahead to 2 points abaft the beam on either side. The minimum size of glass globes shall not be less than 6 inches in diameter and 5 inches high in the clear.

The *small bright white light aft* required to be carried on canal boats in tow shall not be visible forward of the beam.

Lights for water craft propelled by hand power, horse-power, or by the current of the river

Rule 13. *Any vessel propelled by hand power, horse-power, or by the current of the river*, navigating any bay, harbour, or river, or which shall be anchored or moored in or near the channel or fairway of any bay, harbour, or river, except rafts and rowing boats under oars, shall carry one white light forward not less than 8 feet above the surface of the water, which light shall be carried, from sunset to

sunrise, in a lantern so fixed and constructed as to show a clear, uniform, and unbroken light, visible all around the horizon, and of such intensity as to be visible on a dark night with a clear atmosphere at a distance of at least 1 mile.

Rowing boats under oars shall have ready at hand a lantern showing a white light which shall be temporarily exhibited in sufficient time to prevent collision.

Lights for rafts

Rule 14. Rafts propelled by hand power, horse-power, or by the current of the river, or in tow, or which shall be anchored or moored in or near a channel or fairway of other vessels, shall carry lights as follows:—

Rafts of one crib and not more than two in length shall carry one white light. Rafts of three or more cribs in length and one crib in width shall carry one white light at each end of the raft. Rafts of more than one crib abreast shall carry one white light on each outside corner of the raft, making four lights in all.

Bag or boom rafts navigating or anchored in the fairway of any bay, harbour, or river shall carry a bright white light at each end of the raft, and one of such lights on each side midway between the forward and after ends.

The *white light* required by these rules for rafts shall be carried, from sunset to sunrise, in a lantern so fixed and constructed as to show a clear, uniform, and unbroken light, visible all around the horizon, and of such intensity as to be visible on a dark night with a clear atmosphere at a distance of at least 1 mile; which lights shall be suspended from poles of such height that the light shall be not less than 8 feet above the surface of the water.

Lights and day marks for vessels not under command

Rule 15. A vessel which from any accident is not under command shall carry at the same height as the white light mentioned in Rule 2 (a), where they can best be seen, and, if a steam vessel, in lieu of that light, 2 red lights, in a vertical line, one over the other, not less than 6 feet apart, and of such a character as to be visible all around the horizon at a distance of at least 2 miles; and shall by day carry in a vertical line one over the other not less than six feet apart, where they can best be seen, 2 black balls or shapes each 2 feet in diameter.

Rule prohibiting the carrying of unauthorized lights on steam vessels

Rule 16. No master or pilot of any steam vessel shall authorize or permit to be carried, any light, electric or otherwise, not required by these rules, on the outside structure of the cabin or hull of the vessel that in any way will interfere with distinguishing the signal lights.

Rule relating to the use of searchlights

Rule 17. No master or pilot of any steam vessel shall flash or cause to be flashed the rays of the searchlight into the pilot house of any passing vessel.

FOG SIGNALS

Rule 18. A steam vessel shall be provided with an efficient whistle, sounded by steam or by some substitute for steam, placed before the funnel not less than eight feet from the deck, or in such other place where the sound will not be intercepted by any obstruction and of such character as to be heard in ordinary weather at a distance of at least two miles, and with an efficient bell, and it is hereby made the duty of inspectors of steam vessels when inspecting the same to see that each steamer is furnished with such whistle and bell. A sailing vessel shall be provided with an efficient fog horn and with an efficient bell.

Whenever there is thick weather by reason of fog, mist, falling snow, heavy rainstorms, or other causes, whether by day or by night, fog signals shall be used as follows:—

(a) A steam vessel under way, excepting only a steam vessel with raft in tow, shall sound at intervals of not more than one minute three distinct blasts of her whistle.

(b) Every vessel in tow of another vessel shall, at intervals of one minute, sound four bells on a good and efficient and properly placed bell as follows: By striking the bell twice in quick succession, followed by a little longer interval, and then again striking twice in quick succession (in the manner in which four bells is struck in indicating time).

(c) A steamer with a raft in tow shall sound at intervals of not more than one minute a screeching or Modoc whistle for from three to five seconds.

(d) A sailing vessel under way and not in tow shall sound at intervals of not more than one minute—

If on the starboard tack with wind forward of abeam, one blast of her fog horn;

If on the port tack with wind forward of the beam, two blasts of her fog horn;

If she has the wind abaft the beam on either side, three blasts of her fog horn.

(e) Any vessel at anchor and any vessel aground in or near a channel or fairway shall at intervals of not more than two minutes ring the bell rapidly for three to five seconds.

(f) Vessels of less than ten tons registered tonnage, not being steam vessels, shall not be obliged to give the above mentioned signals, but if they do not they shall make some other efficient sound signal at intervals of not more than one minute.

(g) Produce boats, fishing boats, rafts, or other water craft navigating by hand power or by the current of the river, or anchored or moored in or near the channel or fairway and not in any port, and not otherwise provided for in these rules, shall sound a fog horn, or equivalent signal, at intervals of not more than one minute.

Speed to be moderate in fog, and so forth

Rule 19. Every vessel shall, in thick weather, by reason of fog, mist, falling snow, heavy rainstorms, or other causes, go at *moderate speed*. A steam vessel hearing, apparently not more than four points from right ahead, the fog signal of another vessel shall at once reduce her speed to bare steerageway, and navigate with caution until the vessels shall have passed each other.

STEERING AND SAILING RULES

Preliminary

Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk should be deemed to exist.

Sailing Vessels

Rule 20. When two sailing vessels are approaching one another so as to involve risk of collision one of them shall keep out of the way of the other, as follows, namely:—

(a) A vessel which is running free shall keep out of the way of a vessel which is closehauled.

(b) A vessel which is closehauled on the port tack shall keep out of the way of a vessel which is closehauled on the starboard tack.

(c) When both are running free, with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.

(d) When they are running free, with the wind on the same side, the vessel which is to windward shall keep out of the way of the vessel which is to leeward.

Steam Vessels

Signals

Rule 21. In all weathers every steam vessel under way in taking any course authorized or required by these rules shall indicate that course by the following signals on her whistle, to be accompanied, whenever required, by corresponding alteration of her helm; and every steam vessel receiving a signal from another shall promptly respond with the same signal or sound the danger signal as provided in Rule 22:—

One blast means, "I am directing my course to starboard," except when two steamers are approaching each other at right angles or obliquely, other than when one steamer is overtaking another, one short blast signifies intention of steamer which is to starboard of the other to hold course and speed.

Two blasts mean, "I am directing my course to port."

Rule 22. If, when steamers are approaching each other, the pilot of either vessel fails to understand the course or intention of the other, whether from signals being given or answered erroneously, or from other causes, the pilot so in doubt shall immediately signify the same by giving the *danger signal* of five or more short and rapid blasts of the whistle; and if both vessels shall have approached within half a mile of each other, both shall be immediately slowed to a speed barely sufficient for steerageway, and, if necessary, stopped and reversed, until the proper signals are given, answered, and understood, or until the vessels shall have passed each other.

Rule 23. Steam vessels are forbidden to use what has become technically known among pilots as "Cross Signals"—that is, answering one whistle with two, and answering two whistles with one. In all cases, and under all circumstances, a pilot receiving either of the whistle signals provided in the rules, which for any reason he deems injudicious to comply with, instead of answering it with a cross signal, shall at once sound the danger signal and observe the rule applying thereto (Rule 22).

Rule 24. The signals for passing, by the blowing of the whistle, shall be given and answered by pilots in compliance with these rules, not only when meeting "head and head," or nearly so, but at all times when passing or meeting at a distance within a half mile of each other, and whether passing to the starboard or port.

Situations

Rule 25. When steamers are approaching each other, "Head and Head," or nearly so, it shall be the duty of each steamer to pass on the port side of the other; and the pilot of either steamer may be first in determining to pursue this course, and thereupon shall give, as a signal of his intention, one short and distinct blast of his whistle, which the pilot of the other steamer shall answer promptly by a similar blast of his whistle, and thereupon such steamers shall pass on the port side of each other. But if the courses of such steamers are so far on the starboard of each other as not to be considered by pilots as meeting "head and head," or nearly so, the pilot so first deciding shall immediately give two short and distinct blasts of his whistle, which the pilot of the other steamer shall answer promptly by two similar blasts of his whistle, and they shall pass on the starboard side of each other: *Provided, however,* That in all narrow channels where there is a current, and in the rivers Saint Mary, Saint Clair, Detroit, Niagara, and Saint Lawrence, when two steamers are meeting, the descending steamer shall have the right of way, and shall, before the vessels shall have arrived within the distance of one-half mile of each other, give the signal necessary to indicate which side she elects to take.

In the night, steamers will be considered as meeting "head and head" so long as both the coloured lights of each are in view of the other

Rule 26. Whenever a steamer in nearing a short bend or curve in the channel, where, from the height of the banks or other cause,

a steamer approaching from the opposite direction can not be seen for a distance of half a mile, the pilot of such steamer, when he shall have arrived within half a mile of such curve or bend, shall give a signal by one long blast of the whistle, which signal shall be answered by a similar blast, given by the pilot of any steamer within hearing that may be approaching on the other side, and within half a mile of such bend or curve. Should such signal be so answered by a steamer upon the farther side of such bend, then the usual signals for meeting and passing shall immediately be given and answered; but, if the first signal of such pilot be not answered, he is to consider the channel clear and govern himself accordingly.

Rule 27. When a steamer is moved from its dock or berth, and other steamers are liable to approach such steamer from any direction, such steamer and any approaching steamer shall give the same signals as in case of steamers meeting at a bend; but immediately after clearing the dock or berth so as to be fully in sight they shall be governed by the rules for passing.

Rule 28. When one steamer is overtaking another, and the pilot of a steamer which is astern shall desire to pass on the right or starboard hand of the steamer ahead, he shall give one short blast of the whistle, as a signal of such desire and intention, and shall put his helm to port; or if he shall desire to pass on the left or port side of the steamer ahead, he shall give two short blasts of the whistle as a signal of such desire and intention, and shall put his helm to starboard, and the pilot of the steamer ahead shall answer by the same signals; or if he does not think it safe for the steamer astern to attempt to pass at that point, he shall immediately signify the same by giving five or more short and rapid blasts of the whistle, and under no circumstances shall the steamer astern attempt to pass the steamer ahead until such time as they have reached a point where it can be safely done, when said steamer ahead shall signify her willingness by blowing the proper signals. The boat ahead shall in no case attempt to cross the bow or crowd upon the course of the passing steamer.

Every vessel coming up with another vessel from any direction more than two points abaft her beam—that is, in such a position, with reference to the vessel which she is overtaking, that at night she would be unable to see either of that vessel's side lights—shall be deemed to be *an overtaking vessel*; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel

a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally passed and clear.

As by day the overtaking vessel can not always know with certainty whether she is forward of or abaft this direction from the other vessel she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

Rule 29. In all channels less than five hundred feet in width, no steam vessel shall pass another going in the same direction unless the steam vessel ahead be disabled or signify her willingness that the steam vessel astern shall pass, when the steam vessel astern may pass, subject, however, to the other rules applicable to such a situation. And when steam vessels proceeding in opposite directions are about to meet in such channels, both such vessels shall be slowed down to a moderate speed, according to the circumstances.

Rule 30. When two steamers are approaching each other at right angles or obliquely so as to involve risk of collision, other than when one steamer is overtaking another the steamer which has the other on her own port side shall hold her course and speed; and the steamer which has the other on her own starboard side shall keep out of the way of the other by directing her course to starboard so as to cross the stern of the other steamer, or, if necessary to do so, slacken her speed or stop or reverse. The steamer having the other on her own bow shall blow one blast of her whistle as a signal of her intention to cross the bow of the other, holding her course and speed, which signal shall be promptly answered by the other steamer by one short blast of her whistle as a signal of her intention to direct her course to starboard so as to cross the stern of the other steamer or otherwise keep clear.

If from any cause whatever the conditions covered by this situation are such as to prevent immediate compliance with each other's signals, the misunderstanding or objection shall be at once made apparent by blowing the danger signal, and both steamers shall be stopped, and backed if necessary, until signals for passing with safety are made and understood.

Rule 31. When two steam vessels are meeting end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard, so that each shall pass on the port side of the other.

Rule 32. When two steam vessels are crossing so as to involve risk of collision the vessel which has the other on her own starboard side shall keep out of the way of the other.

Rule 33. When a steam vessel and a sailing vessel are proceeding in such directions as to involve risk of collision the steam vessel shall keep out of the way of the sailing vessel.

Rule 34. Where, by any of the rules herein prescribed, one of two vessels shall keep out of the way, the other shall keep her course and speed.

Rule 35. Every steam vessel which is directed by these rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed or stop or reverse.

Rule 36. Notwithstanding anything contained in these rules every vessel overtaking any other shall keep out of the way of the overtaken vessel.

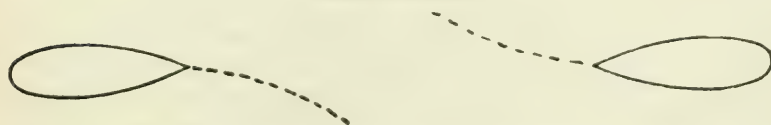
Rule 37. In obeying and construing these rules due regard shall be had to all dangers of navigation and collision and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

Rule 38. Nothing in these rules shall exonerate any vessel, or the owner or master or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or of a neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

Diagrams

The following diagrams are intended to illustrate the working of the system of coloured lights and pilot rules:—

FIRST SITUATION



Here the two coloured lights visible to each will indicate their direct approach "head and head" toward each other. In this

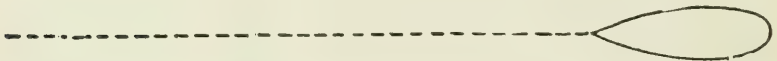
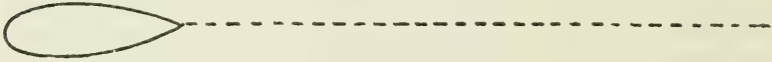
situation it is a standing rule that both shall put their helms to port and pass on the port side of each other, each having previously given one blast of the whistle.

SECOND SITUATION



In this situation the red light only will be visible to each, the screens preventing the green lights from being seen. Both vessels are evidently passing to port of each other, which is rutable in this situation, each pilot having previously signified his intention by one blast of the whistle.

THIRD SITUATION



In this situation the green light only will be visible to each, the screens preventing the red light from being seen. They are therefore passing to starboard of each other, which is rutable in this situation, each pilot having previously signified his intention by two blasts of the whistle.

FOURTH SITUATION



In this situation one steamer is overtaking another steamer from some point within the angle of two points abaft the beams of the overtaken steamer. The overtaking steamer may pass on the starboard or port side of the steamer ahead after the necessary signals for passing have been given, with assent of the overtaken steamer, as prescribed in Rule 28.

FIFTH SITUATION



In this situation two steamers are approaching each other at right angles or obliquely *in such manner as to involve risk of collision*, other than where one steamer is overtaking another.

The steamer which has the other on her own *port* side shall hold course and speed, and the other shall keep clear by crossing astern of the steamer that is holding course and speed, or, if necessary to do so, shall slacken her speed or stop or reverse.

Both steamers shall otherwise observe the provisions of Rule 30 with respect to the signals for passing and the danger signal.

Rule prohibiting unnecessary sounding of the steam whistle

Rule 39. No licensed officer in charge of any steamer shall authorize or permit unnecessary sounding of the steam whistle.

Distress signals

Rule 40. When a vessel is in distress and requires assistance from other vessels or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, viz:—

In the day time:—

1. A gun or other explosive signal fired at intervals of about a minute.
2. The International Code signal of distress indicated by N.C.
3. The distant signal, consisting of a square flag, having either above or below it a ball or anything resembling a ball.
4. A continuous sounding with any fog-signal apparatus.

At night:—

1. A gun or other explosive signal fired at intervals of about a minute.

2. Flame from the vessel (as from burning a tar-barrel, oil-barrel, etc.).

3. Rockets or shells, throwing stars of any colour or description, fired one at a time, at short intervals.

4. A continuous sounding with any fog-signal apparatus.

Rules Concerning Motor Boats Preliminary

In the following rules the words "motor boat" shall include every vessel propelled by machinery and not more than sixty-five feet in length except tug-boats and tow-boats propelled by steam. The length shall be measured from end to end over the deck excluding sheer.

Rule 41. That motor boats subject to the provision of these rules shall be divided into classes as follows:—

Class one. Less than twenty-six feet in length.

Class two. Twenty-six feet or over and less than forty feet in length.

Class three. Forty feet or over and not more than sixty-five feet in length.

Rule 42. That every motor boat in all weathers from sunset to sunrise shall carry the following lights, and during such time no other lights which may be mistaken for those prescribed shall be exhibited.

(a) Every motor boat of class one shall carry the following lights:—

First. A white light aft to show all around the horizon.

Second. A combined lantern in the fore part of the vessel and lower than the white light aft showing green to starboard and red to port, so fixed as to throw the light from right ahead to two points abaft the beam on their respective sides.

(b) Every motor boat of classes two and three shall carry the following lights:—

First. A bright white light in the fore part of the vessel as near the stem as practicable, so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side. The glass or lens shall be of not less than the following dimensions:

Class two. Nineteen square inches.

Class three. Thirty-one square inches.

Second. A white light aft to show all around the horizon.

Third. On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side. On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass so fixed as to throw the light from right ahead to two points abaft the beam on the port side. The glasses or lenses in the said side lights shall be of not less than the following dimensions on motor boats of—

Class two. Sixteen square inches.

Class three. Twenty-five inches.

On and after March first, nineteen hundred and seventeen, all glasses or lenses prescribed by paragraph (b) of Rule 42 shall be fresnel or fluted. The said lights shall be fitted with inboard screens of sufficient height and so set as to prevent these lights from being seen across the bow and shall be of not less than the following dimensions on motor boats of—

Class two. Eighteen inches long.

Class three. Twenty-four inches long: *Provided*, That motor boats as defined in these Rules, when propelled by sail and machinery or under sail alone, shall carry the coloured lights suitably screened but not the white lights prescribed by this Rule.

Rule 43. (a) Every motor boat under the provisions of these Rules shall be provided with a whistle or other sound-producing mechanical appliance capable of producing a blast of two seconds or more in duration, and in the case of such boats so provided a blast of at least two seconds shall be deemed a prolonged blast within the meaning of these Rules.

(b) Every motor boat of class two or three shall carry an efficient fog horn.

(c) Every motor boat of class two or three shall be provided with an efficient bell, which shall be not less than eight inches across the mouth on board of vessels of class three.

Rule 45. The foregoing Rules shall be in full force and effect on and after the first day of March, nineteen hundred and sixteen, and shall supersede all Rules of the Road for the Great Lakes, etc., previously adopted.

“ INTERNATIONAL RULES OF THE ROAD ”

In force in all navigable waters within Canada or within the jurisdiction of the Parliament thereof, except the waters of lakes Superior and Huron, Georgian bay, lakes Erie and Ontario, their connecting and tributary waters, and the St. Lawrence river as far East as the lower exit of the Lachine canal and the Victoria bridge at Montreal.

For rules of the road for the Great Lakes and St. Lawrence River above Montreal, see p. 109.

ORDER IN COUNCIL

AT THE GOVERNMENT HOUSE AT OTTAWA,

TUESDAY, the 9th day of February, 1897.

PRESENT :

HIS EXCELLENCY THE GOVERNOR GENERAL IN
COUNCIL

Whereas, by the fourteenth section of the Act intituled “ An Act respecting the navigation of Canadian waters,” being chapter 79 of the Revised Statutes of Canada, it is enacted, that if Her Majesty, by Order in Council, annuls or modifies any of the regulations for preventing collisions on navigable waters which, by order of Her Majesty in Council of the fourteenth day of August, 1879, were substituted for those theretofore in force for like purposes in the United Kingdom, or makes new regulations in addition thereto, or in substitution therefor, the Governor in Council may from time to time make corresponding changes, as respects Canadian waters, in the regulations contained in the second section of the Act hereinbefore quoted.

And whereas, by an order of Her Majesty in Council, dated the 27th day of November, 1896, the existing regulations for preventing collisions at sea were annulled, and new regulations substituted therefor:—

His Excellency, under the provisions of the fourteenth section of the said Act, chapter 79 of the Revised Statutes, and by and with the

advice of the Queen's Privy Council for Canada, is pleased to order that the following rules and regulations, which are in conformity with the regulations approved by the order of Her Majesty in Council of the 27th of November, 1896, be substituted for the existing second section of the said Act, chapter 79 of the Revised Statutes; and that the said new Rules and Regulations shall come into operation on and from the first day of July, 1897:

And His Excellency doth further order that the Minister of Marine and Fisheries do bring the provisions of the sections thus amended to the notice of the owners and masters of Canadian vessels.

REGULATIONS FOR PREVENTING COLLISIONS AND FOR DISTRESS SIGNALS

(2) The following rules with respect to lights, fog signals, distress signals, steering and sailing, and rafts shall apply to all rivers, lakes and other navigable waters within Canada, or within the jurisdiction of the Parliament thereof, that is to say:—

Preliminary

In the following rules every steam vessel which is under sail and not under steam is to be considered a sailing vessel, and every vessel under steam, whether under sail or not, is to be considered a steam vessel.

The words "steam vessel" shall include any vessel propelled by machinery.

A vessel is "under way" within the meaning of these rules, when she is not at anchor, or made fast to the shore or aground.

Rules Concerning Lights, etc.

The word "visible" in these rules, when applied to lights, shall mean visible on a dark night with clear atmosphere.

Article 1. The rules concerning lights shall be complied with in all weathers from sunset to sunrise, and during such time no other lights which may be mistaken for the prescribed lights shall be exhibited.

Article 2. A steam vessel when under way shall carry:—

(a) On or in front of the foremast, or if a vessel without a foremast, then in the forepart of the vessel, at a height above the hull of

not less than 20 feet, and if the breadth of the vessel exceeds 20 feet, then at a height above the hull not less than such breadth, so, however, that the light need not be carried at a greater height above the hull than 40 feet, a bright white light, so constructed as to show an unbroken light over an arc of the horizon of 20 points of the compass, so fixed as to throw the light 10 points on each side of the vessel, viz., from right ahead to 2 points abaft the beam on either side, and of such a character as to be visible at a distance of at least 5 miles.

(b) On the starboard side a green light, so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the starboard side, and of such a character as to be visible at a distance of at least 2 miles.

(c) On the port side, a red light so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the port side, and of such a character as to be visible at a distance of at least two miles.

(d) The said green and red side-lights shall be fitted with inboard screens projecting at least 3 feet forward from the light, so as to prevent these lights from being seen across the bow.

(e) A steam vessel when under way may carry an additional white light similar in construction to the light mentioned in subdivision (a). These two lights shall be so placed in line with the keel that one shall be at least 15 feet higher than the other, and in such a position with reference to each other that the lower light shall be forward of the upper one. The vertical distance between these lights shall be less than the horizontal distance.

Article 3. A steam vessel when towing another vessel shall, in addition to her side-lights, carry two bright white lights in a vertical line one over the other, not less than 6 feet apart, and when towing more than one vessel shall carry an additional bright white light 6 feet above or below such lights, if the length of the tow, measuring from the stern of the towing vessel to the stern of the last vessel towed, exceeds 600 feet. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light mentioned in article 2 (a), except the additional light, which may be carried at a height of not less than 14 feet above the hull.

Such steam vessel may carry a small white light abaft the funnel or aftermast for the vessel towed to steer by, but such light shall not be visible forward of the beam.

Article 4. (a) A vessel which from any accident is not under command shall carry at the same height as the white light mentioned in article 2 (a), where they can best be seen, and, if a steam vessel, in lieu of that light, two red lights, in a vertical line one over the other, not less than 6 feet apart, and of such a character as to be visible all round the horizon at a distance of at least two miles; and shall by day carry in a vertical line one over the other not less than 6 feet apart, where they can best be seen, two black balls or shapes each 2 feet in diameter.

(b) A vessel employed in laying or in picking up a telegraph cable shall carry in the same position as the white light mentioned in article 2 (a), and if a steam vessel, in lieu of that light, three lights in a vertical line one over the other, not less than 6 feet apart. The highest and lowest of these lights shall be red, and the middle light shall be white, and they shall be of such a character as to be visible all round the horizon, at a distance of at least two miles. By day she shall carry in a vertical line one over the other, not less than 6 feet apart, where they can best be seen, three shapes not less than 2 feet in diameter, of which the highest and lowest shall be globular in shape and red in colour, and the middle one diamond in shape and white.

(c) The vessel referred to in this article when not making way through the water, shall not carry side-lights, but when making way shall carry them.

(d) The lights and shapes required to be shown by this article are to be taken by other vessels as signals that the vessel showing them is not under command, and cannot therefore get out of the way.

These signals are not signals of vessels in distress and requiring assistance. Such signals are contained in article 31.

Article 5. A sailing vessel under way, and any vessel being towed, shall carry the same lights as are prescribed by article 2 for a steam vessel under way, with the exception of the white lights mentioned therein, which they shall never carry.

Article 6. Whenever, as in the case of small vessels under way during bad weather, the green and red side-lights cannot be fixed, these lights shall be kept at hand lighted and ready for use; and

shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision in such manner as to make them most visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side, nor, if practicable, more than two points abaft the beam on their respective sides.

To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the colour of the light they respectively contain, and shall be provided with proper screens.

Article 7. Steam vessels of less than 40, and vessels under oars or sails of less than 20 tons gross tonnage respectively, and rowing boats, when under way, shall not be obliged to carry the lights mentioned in article 2 (a), (b) and (c), but if they do not carry them, they shall be provided with the following lights:—

1. Steam vessels of less than 40 tons shall carry:—

(a) In the forepart of the vessel, or on or in front of the funnel, where it can best be seen, and at a height above the gunwale of not less than 9 feet, a bright white light constructed and fixed as prescribed in article 2 (a), and of such a character as to be visible at a distance of at least two miles.

(b) Green and red side-lights constructed and fixed as prescribed in article 2 (b) and (c), and of such a character as to be visible at a distance of at least one mile, or a combined lantern showing a green light and a red light from right ahead to two points abaft the beam on their respective sides. Such lantern shall be carried not less than 3 feet below the white light.

2. Small steamboats, such as are carried by sea-going vessels, may carry the white light at a less height than 9 feet above the gunwale, but it shall be carried above the combined lantern, mentioned in subdivision 1 (b).

3. Vessels under oars or sails, of less than 20 tons, shall have ready at hand a lantern with a green glass on one side and a red glass on the other, which, on the approach of or to the other vessels, shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

4. Rowing boats, whether under oars or sails, shall have ready at hand a lantern showing a white light, which shall be temporarily exhibited in sufficient time to prevent collision.

The vessels referred to in this article shall not be obliged to carry the lights prescribed by article 4 (a) and article 11, last paragraph.

Article 8. Pilot vessels, when engaged on their station on pilotage duty, shall not show the lights required for other vessels, but shall carry a white light at the masthead, visible all round the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals, which shall never exceed 15 minutes. On the near approach of or to other vessels they shall have their side-lights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the green light shall not be shown on the port side, nor the red light on the starboard side.

A pilot vessel of such a class as to be obliged to go alongside of a vessel to put a pilot on board, may show a white light instead of carrying it at the masthead, and may, instead of the coloured lights above mentioned, have at hand ready for use a lantern with a green glass on one side and a red glass on the other, to be used as prescribed above.

Pilot vessels when not engaged on their station on pilotage duty, shall carry lights similar to those of other vessels of their tonnage.

REGULATIONS FOR PREVENTING COLLISIONS OF SHIPS

Article 9. Fishing vessels and fishing boats, when under way and when not required by this article to carry or show the lights hereinafter specified, shall carry or show the lights prescribed for vessels of their tonnage under way.

(a) Open boats, by which it is to be understood boats not protected from the entry of sea water by means of a continuous deck, when engaged in any fishing at night with outlying tackle extending not more than 150 feet horizontally from the boat into the seaway, shall carry one all-round white light.

Open boats when fishing at night, with outlying tackle extending more than 150 feet horizontally from the boat into the seaway, shall carry one all-round white light, and in addition, on approaching or being approached by other vessels, shall show a second white light at least 3 feet below the first light and at a horizontal distance of at least 5 feet away from it in the direction in which the outlying tackle is attached.

(b) Vessels and boats, except open boats as defined in subdivision (a), when fishing with drift-nets, shall, so long as the nets are wholly or partly in the water, carry two white lights where they can best be seen. Such lights shall be placed so that the vertical distance between them shall be not less than 6 feet and not more than 15 feet, and so that the horizontal distance between them, measured in a line with the keel, shall be not less than 5 feet and not more than 10 feet. The lower of these two lights shall be in the direction of the nets, and both of them shall be of such a character as to show all round the horizon, and to be visible at a distance of not less than 3 miles.

(c) Vessels and boats, except open boats as defined in subdivision (a), when line-fishing with their lines out and attached to or hauling their lines, and when not at anchor or stationary, within the meaning of subdivision (g), shall carry the same lights as vessels fishing with drift-nets. When shooting lines or fishing with towing lines, they shall carry the lights prescribed for a steam or sailing vessel under way, respectively.

(d) Oyster dredges and other vessels fishing with dredge nets, shall—

1. If steam vessels, carry in the same position as the white light mentioned in article 2 (a), a tri-coloured lantern so constructed and fixed as to show a white light from right ahead to two points on each bow, and a green light and a red light over an arc of the horizon from two points on each bow to two points abaft the beam on the starboard and port sides respectively; and not less than 6 nor more than 12 feet below the tri-coloured lantern a white light in a lantern so constructed as to show a clear uniform and unbroken light all round the horizon.

2. If sailing vessels, shall carry a white light in a lantern, so constructed as to show a clear uniform and unbroken light all round the horizon, and shall also, on the approach of or to other vessels, show where it can best be seen a white flare-up light or torch in sufficient time to prevent collision.

All lights mentioned in subdivision (d) 1 and 2 shall be visible at a distance of at least 2 miles.

(e) Fishing vessels and fishing boats may at any time use a flare-up light in addition to the lights which they are by this article required to carry and show, and they may also use working lights.

(f) Every fishing vessel and every fishing boat under 150 feet in length, when at anchor, shall exhibit a white light visible all round the horizon at a distance of at least one mile.

Every fishing vessel of 150 feet in length or upwards, when at anchor, shall exhibit a white light visible all round the horizon at a distance of at least one mile, and shall exhibit a second light as provided for vessels of such length by article 11.

Should any such vessel, whether under 150 feet in length or of 150 feet in length or upwards, be attached to a net or other fishing gear, she shall on the approach of other vessels show an additional white light at least 3 feet below the anchor light, and at a horizontal distance of at least 5 feet away from it in the direction of the net or gear.

(g) If a vessel or boat when fishing becomes stationary in consequence of her gear getting fast to a rock or other obstruction, she shall in day time haul down the day signal required by subdivision (i); at night show the light or lights prescribed for a vessel at anchor; and during fog, mist, falling snow, or heavy rain storms make the signal prescribed for a vessel at anchor. (See the last paragraph of article 15.)

(h) In fog, mist, falling snow, or heavy rain storms, drift-net vessels attached to their nets, and vessels when dredging, or when line-fishing with their lines out, shall, if of 20 tons gross tonnage or upwards, respectively, at intervals of not more than one minute make a blast; if steam vessels, with the whistle or siren, and if sailing vessels with the fog horn; each blast to be followed by ringing the bell. Fishing vessels and boats of less than 20 tons gross tonnage shall not be obliged to give the above-mentioned signals; but if they do not, they shall make some other efficient sound signal at intervals of not more than one minute.

(i) All vessels or boats fishing with nets or lines, when under way, shall in day time indicate their occupation to an approaching vessel by displaying a basket or other efficient signal where it can best be seen. If vessels or boats at anchor have their gear out, they shall, on the approach of other vessels, show the same signal on the side on which those vessels can pass.

The vessels required by this article to carry or show the lights hereinbefore specified shall not be obliged to carry the lights prescribed by article 4 (a), and the last paragraph of article 11.

Article 10. A vessel which is being overtaken by another shall show from her stern to such last-mentioned vessel a white light or a flare-up light.

The white light required to be shown by this article may be fixed and carried in a lantern, but in such case the lantern shall be so

constructed, fitted and screened that it shall throw an unbroken light over an arc of the horizon of 12 points of the compass, viz., for 6 points from right aft on each side of the vessel so as to be visible at a distance of at least one mile. Such light shall be carried as nearly as practicable on the same level as the side-lights.

Article 11. A vessel under 150 feet in length, when at anchor, shall carry forward where it can best be seen, but at a height not exceeding 20 feet above the hull, a white light in a lantern so constructed as to show a clear, uniform and unbroken light visible all round the horizon at a distance of at least one mile.

A vessel of 150 feet or upwards in length, when at anchor, shall carry in the forward part of the vessel, at a height of not less than 20, and not exceeding 40 feet above the hull, one such light and at or near the stern of the vessel, and at such a height that it shall be not less than 15 feet lower than the forward light, another such light.

The length of the vessel shall be deemed to be the length appearing on her certificate of registry.

A vessel aground in or near a fairway shall carry the above light or lights, and the two red lights prescribed by article 4 (a).

Article 12. Every vessel may, if necessary, in order to attract attention, in addition to the lights which she is by these rules required to carry, show a flare-up light or use any detonating signal that cannot be mistaken for a distress signal.

Article 13. Nothing in these rules shall interfere with the operation of any special rules made by the government of any nation with respect to additional station and signal lights for two or more ships of war or for vessels sailing under convoy, or with the exhibition or recognition signals adopted by ship-owners, which have been authorized by their respective governments and duly registered and published.

Article 14. A steam vessel proceeding under sail only, but having her funnel up, shall carry in day time, forward, where it can best be seen, one black ball or shape 2 feet in diameter.

Sound Signals for Fog, etc.

Article 15. All signals prescribed by this article for vessels under way shall be given:

1. By "steam vessels," on the whistle or siren.
2. By "sailing vessels and vessels towed," on the fog horn.

The words "prolonged blast" used in this article, shall mean a blast of from 4 to 6 seconds' duration.

A steam vessel shall be provided with an efficient whistle or siren, sounded by steam or some substitute for steam, so placed that the sound may not be intercepted by any obstruction, and with an efficient fog horn, to be sounded by mechanical means, and also with an efficient bell. A sailing vessel of 20 tons gross tonnage or upwards shall be provided with a similar fog horn and bell. In fog, mist, falling snow, or heavy rain storms, whether by day or night, the signals described in this article shall be used as follows:—

(a) A steam vessel having way upon her shall sound, at intervals of not more than 2 minutes, a prolonged blast.

(b) A steam vessel under way, but stopped and having no way upon her, shall sound at intervals of not more than 2 minutes, two prolonged blasts, with an interval of about one second between them.

(c) A sailing vessel under way shall sound, at intervals of not more than one minute, when on the starboard tack, one blast, when on the port tack, two blasts in succession, and when with the wind abaft the beam, three blasts in succession.

(d) A vessel when at anchor shall, at intervals of not more than one minute, ring the bell rapidly for about 5 seconds.

(e) A vessel, when towing a vessel employed in laying or in picking up a telegraph cable, and a vessel under way, which is unable to get out of the way of an approaching vessel through being not under command, or unable to manœuvre as required by these rules, shall instead of the signals prescribed in subdivisions (a) and (c) of this article, at intervals of not more than 2 minutes, sound three blasts in succession, viz., one prolonged blast, followed by two short blasts. A vessel towed may give this signal and she shall not give any other.

Sailing vessels and boats of less than 20 tons gross tonnage shall not be obliged to give the above-mentioned signals, but if they do not, they shall make some other efficient sound-signal at intervals of not more than one minute.

Speed of Ships to be Moderate in Fog, etc.

Article 16. Every vessel shall, in a fog, mist, falling snow, or heavy rain storms, go at a moderate speed, having careful regard to the existing circumstances and conditions.

A steam vessel hearing, apparently forward of her beam, the fog signal of a vessel, the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.

STEERING AND SAILING RULES

Preliminary—Risk of Collision

Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk shall be deemed to exist.

Article 17. When two sailing vessels are approaching one another so as to involve risk of collision, one of them shall keep out of the way of the other, as follows, viz:—

(a) A vessel which is running free shall keep out of the way of a vessel which is close hauled.

(b) A vessel which is close hauled on the port tack shall keep out of the way of a vessel which is close hauled on the starboard tack.

(c) When both are running free, with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.

(d) When both are running free, with the wind on the same side, the vessel which is to the windward shall keep out of the way of the vessel which is to leeward.

(e) A vessel which has the wind aft shall keep out of the way of the other vessel.

Article 18. When two steam vessels are meeting end on, or nearly end on, so as to involve risks of collision, each shall alter her course to starboard so that each may pass on the port side of the other.

This article only applies to cases where vessels are meeting end on, or nearly end on, in such a manner as to involve risk of collision, and does not apply to two vessels which must, if both keep on their respective courses, pass clear of each other.

The only cases to which it does apply are when each of the two vessels is end on, or nearly end on, to the other; in other words, to cases in which, by day, each vessel sees the masts of the other in a line, or nearly in a line, with her own; and by night, to cases in which each vessel is in such a position as to see both the side lights of the other.

It does not apply, by day, to cases in which a vessel sees another ahead crossing her own course; or by night, to cases where the red light of one vessel is opposed to the red light of the other, or where the green light of one vessel is opposed to the green light of the other, or where a red light without a green light, or a green light without a red light, is seen ahead, or where both green and red lights are seen anywhere but ahead.

Article 19. When two steam vessels are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way of the other.

Article 20. When a steam vessel and a sailing vessel are proceeding in such directions as to involve risk of collision, the steam vessel shall keep out of the way of the sailing vessel.

Article 21. Where by any of these rules one of two vessels is to keep out of the way, the other shall keep her course and speed.

NOTE.—When, in consequence of thick weather or other causes, such vessel finds herself so close that collision cannot be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision.

(See articles 27 and 29.)

Article 22. Every vessel which is directed by these rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.

Article 23. Every steam vessel which is directed by these rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed or stop or reverse.

Article 24. Notwithstanding anything contained in these rules, every vessel, overtaking any other, shall keep out of the way of the overtaken vessel.

Every vessel coming up with another vessel from any direction more than 2 points abaft her beam, i.e., in such a position, in reference to the vessel which she is overtaking, that at night she would be unable to see either of that vessel's side-lights, shall be deemed to be an overtaking vessel, and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

As by day the overtaking vessel cannot always know with certainty whether she is forward of or abaft this direction from the

other vessel, she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

Article 25. In narrow channels every steam vessel shall, when it is safe and practicable, keep to that side of the fairway or mid-channel, which lies on the starboard side of such vessel.

Article 26. Sailing vessels under way shall keep out of the way of sailing vessels or boats fishing with nets, or lines, or trawls. This rule shall not give to any vessel or boat engaged in fishing the right of obstructing a fairway used by vessels other than fishing vessels or boats.

Article 27. In obeying and construing these rules, due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

Sound Signals for Vessels in sight of one another

Article 28. The word "short blast" used in this article shall mean a blast of about one second's duration.

When vessels are in sight of one another, a steam vessel under way, in taking any course authorized or required by these rules, shall indicate that course by the following signals on her whistle or siren, viz:—

One short blast to mean: "I am directing my course to star-board."

Two short blasts to mean: "I am directing my course to port."

Three short blasts to mean: "My engines are going full speed astern."

No Vessel under any circumstances to Neglect Proper Precautions

Article 29. Nothing in these rules shall exonerate any vessel, or the owner, or master, or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper look-out or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

Reservation of Rules for Harbours and Inland Navigation

Article 30. Nothing in these rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbour, river or inland waters.

Distress Signals

Article 31. When a vessel is in distress and requires assistance from other vessels or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, viz:—

In the day time—

1. A gun or other explosive signal fired at intervals of about a minute;
2. The International Code signal of distress indicated by N.C.;
3. The distant signal, consisting of a square flag, having either above or below it a ball or anything resembling a ball;
4. A continuous sounding with any fog-signal apparatus.

At night—

1. A gun or other explosive signal fired at intervals of about a minute;
2. Flames on the vessel (as from a burning tar barrel, oil barrel, etc.);
3. Rockets or shells, throwing stars of any colour or description, fired one at a time, at short intervals;
4. A continuous sounding with any fog-signal apparatus.

Rafts and Harbour of Sorel

Article 32. Rafts, while drifting or at anchor on any of the waters of Canada, shall have a bright fire kept burning on them from sunset to sunrise. Whenever any raft is going in the same direction as another which is ahead, the one shall be so navigated as not to come within twenty yards of the other, and every vessel meeting or overtaking a raft shall keep out of the way thereof.

Rafts shall be so navigated and anchored as not to cause any unnecessary impediment or obstruction to vessels navigating the same waters.

Article 33. Unless it is otherwise directed by the Department of Marine, ships and vessels entering or leaving the harbour of Sorel, shall take the port side, anything in the preceding articles to the contrary notwithstanding.

Article 34. The rules of navigation contained in articles 32 and 33 shall be subject to the provisions contained in articles 27 and 29.

JOHN J. MCGEE,

Clerk of the Privy Council.

Notes on Treatment of the Apparently Drowned and on Rescuing Drowning Persons

In the following notes two methods of resuscitating apparently drowned persons are described—the Schäfer method and the Howard Sylvester method; of these two the former is the more recent idea and the simpler to a person unaccustomed to the work, and is that taught seamen and boys of the Royal Navy. The Howard Sylvester method is usually practised among the life saving crews of the United States sea-board.

LIFE SAVING

(As taught by the Royal Life Saving Society)

Extract from 'Manual of Seamanship for the Royal Navy'

In attempting to rescue a drowning person it must be remembered that the rescuer is at an advantage, and if he only retains his presence of mind he should have no difficulty in effecting a rescue. If, however, he should be unacquainted with the proper methods of rescue and release, great caution should be exercised.

The following rules should be observed—special attention being paid to the method of resuscitation.

Method of Rescue

There are five practical methods of carrying a person in the water, and those who are ignorant of what to do in cases of emergency can, in the course of ten or twelve lessons, become thoroughly proficient and able to render valuable aid in saving life without risk or danger to themselves. The methods are as follows:

1. When the drowning person is not struggling take him by the hair and, by a quick twist turn him on his back, and place your hand on either side of his face. Then lie on your back, hold him in front of you, and swim with the back leg stroke, taking care to keep his face above the water.

2. In cases of struggling, which renders the drowning person difficult to manage, turn him on his back as before, and take a firm hold of his arms just above the elbows. Draw his arms upwards at right angles to his body and swim with back stroke. This hold will put the drowning person under the control of the rescuer, and prevent him from turning round, clutching, or even struggling.

3. If the arms be difficult to grasp, slip your hands under the armpits of the drowning person and place them on his chest or round his arms, raise them at right angles to his body, and then lie on your back and swim with the back stroke.

4. To render assistance to a swimmer attacked by cramp, or exhausted, as well as to those in danger of drowning who may be obedient and remain quiet, the person assisted must place his hands on the rescuer's shoulders close to the neck, with his arms at full stretch, and lie on his back perfectly still, with the head held well back. The rescuer being uppermost, and having arms and legs free, swims with the breast stroke. This is by far the easiest method, and without undue exertion a person can be carried a much longer distance than by any other method.

5. Another method of rescuing a person when passive is to hold him with one arm placed over one of his shoulders or under one of his arms, with your hand under the opposite armpit, or holding him by his clothes, thus leaving your other arm free with which to propel yourself. This method will be useful to overarm swimmers as well as to back-stroke swimmers, for although the rescuer may be partially on his back, he will be able to use either the over-arm or the back-stroke kick. In order that the rescuer shall not be obliged to reverse his stroke, he should make use of his usual over-arm for the purpose of holding the drowning person.

METHOD OF RELEASE

The following are the three methods recommended for releasing one's self from the clutch of a drowning person:—

1. If the rescuer be held by the wrists, he must turn both arms simultaneously against the drowning person's thumbs, and bring his arms at right angles to the body, thus dislocating the thumbs of the drowning person if he does not leave go.

2. If clutched round the neck he must take a deep breath and lean well over the drowning person, at the same time place one hand in the small part of his back, raise the other arm in line with the shoulder, and pass it over the drowning person's arm, then pinch the nostrils close with the fingers and at the same time place the palm of the hand on the chin, and push away with all possible force. The holding of the nose will make the drowning person open his mouth for breathing; being under water choking will ensue, and the rescuer will gain complete control.

3. If clutched round the body and arms or round the body only, the rescuer must lean well over the drowning person, take a breath as before, and either withdraw both arms in an upward direction in front of his body, or act in accordance with the instructions for releasing one's-self if held round the neck. In either case place the one hand on his shoulder, and the palm of the other hand against his chin, at the same time bring the knee up against the lower part of his chest, and then by means of a strong and sudden push stretch the arms and leg straight out, throwing the whole weight of the body backwards. This sudden motion will break the clutch and leave the rescuer free.

TREATMENT OF APPARENTLY DROWNED

When a person is lifted out of the water in an apparently drowned condition, there must be no loss of time in attempting restoration. The means used to restore life must be carried out with caution, perseverance, and continuous energy, as life has, in many cases, been restored after long hours of unceasing work.

Immediately on removal from the water, and if breathing has ceased, place the patient face downwards on the ground, then, without stopping to remove clothing, commence artificial respiration, *as every instant of delay is serious.*

Avoid rough usage, especially twisting or bending of limbs, and under no circumstances hold the patient up by his feet.

In all cases send for medical assistance as soon as possible.

In the event of respiration not being entirely suspended when a person is lifted out of the water, it may not be necessary to imitate breathing; in that case he may be placed upon his side and natural respiration may be assisted by the application of an irritant substance to the nostrils and tickling the nose. Smelling salts, pepper, or snuff may be used.

To effect artificial respiration put yourself astride or on one side of the patient's body, in a kneeling position, facing his head. (See diagram). Placing your hands flat in the small of his back, with the thumbs nearly touching and the fingers spread out on each side of the body over the lowest ribs, lean forward, and steadily allow the weight of your body to fall over upon them, and so produce a firm downward pressure, which must not be violent.

By this means the air (and water, if there be any) is driven out of the patient's lungs. Immediately thereafter swing backward, rapidly releasing the pressure but without lifting the hands from the

patient's body. Repeat this forward and backward movement (pressure and relaxation of pressure) every four or five seconds. In other words, sway your body forward and backward upon your hands twelve or fifteen times a minute, without any marked pause between the movements.



By these means an exchange of air is produced in the lungs similar to that effected by natural respiration; every pressure forces air out of the chest, every relaxation of pressure causes it to pass in.

This procedure must be pursued until natural respirations are resumed. If they are resumed and, as sometimes happens, again tend to fail, the process of artificial respiration must be resorted to as before.

Whilst the operator is carrying out artificial respiration, others may, if there be opportunity, busy themselves with applying hot flannels to the limbs and body, and hot bottles to the feet, or promote warmth by friction; but no attempt should be made on the part of the operator to remove the wet clothing or to give any restoratives by the mouth until natural breathing has recommenced.

When natural respiration is once established, cease to imitate the movements of breathing. Then you may turn the patient's face upward and proceed with the treatment for the promotion of warmth and circulation.

Friction over the surface of the body must be resorted to using handkerchiefs, flannels, etc. By these means the blood is propelled along the veins towards the heart.

The friction along the legs, arms, and body should all be towards the heart, and continued after the patient has been wrapped in blankets or some dry clothing.

As soon as possible after breathing has been established, remove the patient to the nearest house, and further, promote warmth by the application of hot flannels to the pit of the stomach, and bottles, or bladders, of hot water, heated bricks, &c., to the armpits, between the thighs, and to the soles of the feet. If there be pain or difficulty in breathing, apply a hot linseed-meal poultice to the chest.

On the restoration of life, a teaspoonful of warm water may be given; and then if the power of swallowing has returned, very small quantities of wine, warm brandy and water, beef-tea, or coffee administered, the patient kept in bed, and a disposition to sleep encouraged.

Watch the patient carefully for some time to see that breathing does not fail.

If the patient has been carried to the house, be careful to let the air circulate freely about the room, and prevent crowding round the patient.

RESTORING THE APPARENTLY DROWNED ACCORDING TO THE RULES OF THE UNITED STATES LIFE-SAVING SERVICE

NOTE.—These directions differ from those given in previous Regulations issued to the Life Saving Service by the addition of



Fig. 2

means for securing deeper inspiration. The method heretofore published, known as the Howard, or Direct Method, has been productive of excellent results and is retained here. It is, however, here

arranged for practice in combination with the Sylvester method, the latter producing deeper inspiration than any other known method, while the former effects the most complete expiration. The combination, therefore, tends to produce the most rapid oxygenation of the blood—the real object to be gained. The combination is prepared primarily for the use of life-saving crews where assistants are at hand. A modification of Rule III, however, is published as a guide in cases where no assistants are at hand and one person is compelled to act alone.

RULE I. *Arouse the patient.*—Do not move the patient unless in danger of freezing; instantly expose the face to the air, toward the wind if there be any; wipe dry the mouth and nostrils; rip the clothing so as to expose the chest and waist; give two or three quick smarting slaps on the chest with the open hand.

If the patient does not revive proceed immediately as follows:

RULE II. *To expel water from the stomach and chest* (see fig. 2).—Separate the jaws and keep them apart by placing between the

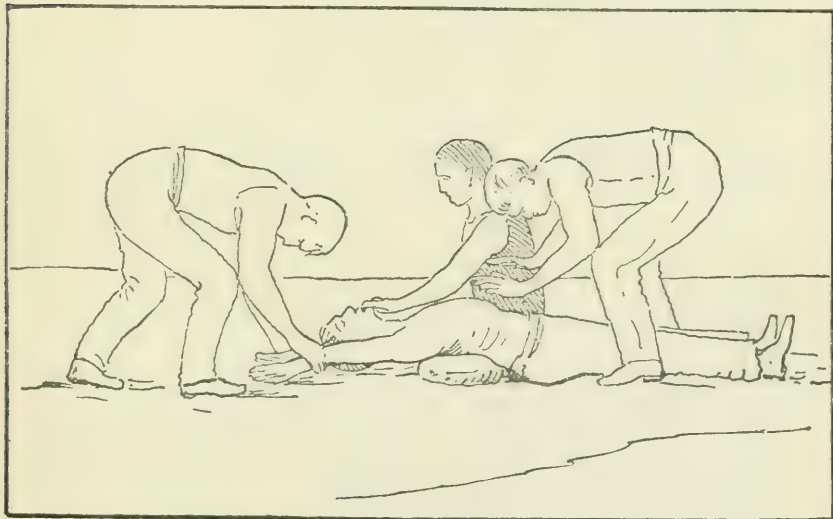


Fig. 3

teeth a cork or small bit of wood; turn the patient on his face, a large bundle of tightly rolled clothing being placed beneath the stomach; press heavily on the back over it for half a minute, or as long as fluids flow freely from the mouth.

RULE III. *To produce breathing* (see figs. 3 and 4).—Clear the mouth and throat of mucus by introducing into the throat the corner

of a handkerchief wrapped closely around the forefinger; turn the patient on the back, the roll of clothing being so placed as to raise the pit of the stomach above the level of the rest of the body. Let an assistant with a handkerchief or piece of dry cloth draw the tip of the tongue out of the corner of the mouth (which prevents the tongue from falling back and choking the entrance to the wind-pipe), and keep it projecting a little beyond the lips. Let another assistant grasp the arms just below the elbows and draw them steadily upward by the sides of the patient's head to the ground, the hands nearly meeting (which enlarges the capacity of the chest and induces inspiration). (Fig. 3.) While this is being done let a

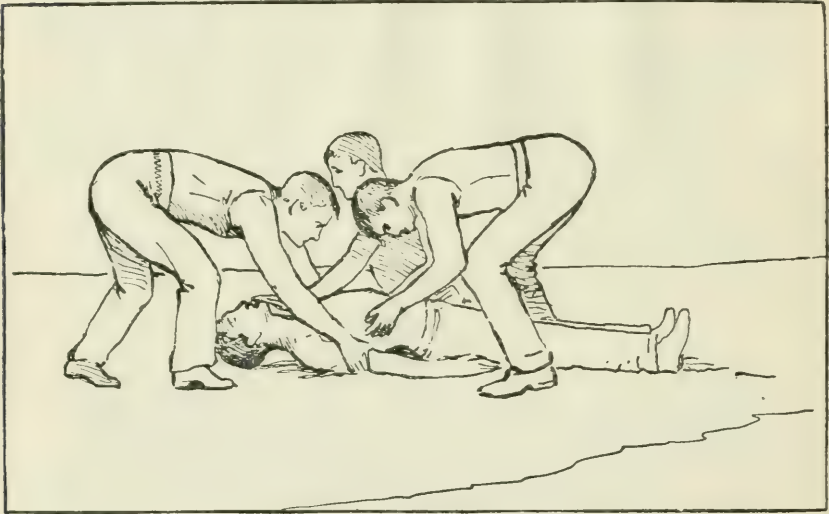


Fig. 4

third assistant take position astride the patient's hips with his elbows resting upon his own knees, his hands extended ready for action. Next, let the assistant standing at the head turn down the patient's arms to the sides of the body, the assistant holding the tongue, changing hands if necessary* to let the arms pass. Just before the patient's hands reach the ground the man astride the body will grasp the body with his hands, the balls of the thumbs resting on either side of the pit of the stomach, the fingers falling into the grooves between the short ribs. Now, using his knees as a pivot, he will at the moment the patient's hands touch the ground

*Changing hands will be found unnecessary after some practice; the tongue, however, must not be released.

throw (not too suddenly) all his weight forward on his hands, and at the same time squeeze the waist between them as if he wished to force anything in the chest upward out of the mouth; he will deepen the pressure while he slowly counts one, two, three, four, (about five seconds), then suddenly let go with a final push, which will spring him back to his first position.† This completes expiration. (Fig. 4.)

At the instant of his letting go, the man at the patient's head will again draw the arms steadily upward to the sides of the patient's head as before (the assistant holding the tongue again, changing hands to let the arms pass if necessary), holding them there while he slowly counts one, two, three, four (about five seconds).

Repeat these movements deliberately and perseveringly twelve or fifteen times in every minute—thus imitating the natural motions of breathing.

If natural breathing be not restored after a trial of the bellows movement for the space of about four minutes, then turn the patient a second time on the stomach, as directed in Rule II, rolling the body in the opposite direction from that which it was first turned, for the purpose of freeing the air passage from any remaining water. Continue the artificial respiration from one to four hours, or until the patient breathes, according to Rule III; and for a while, after the appearance of returning life, carefully aid the first short gasps until deepened into full breaths. Continue the drying and rubbing, which should have been unceasingly practised from the beginning by assistants, taking care not to interfere with the means employed to produce breathing. Thus the limbs of the patient should be rubbed, always in an upward direction towards the body, with firm-grasping pressure and energy, using the bare hands, dry flannels, or handkerchiefs, and continuing the friction under the blankets or over the dry clothing. The warmth of the body can also be promoted by the application of hot flannels to the stomach and armpits, bottles or bladders of hot water, heated bricks, etc., to the limbs and soles of the feet.

RULE IV. AFTER-TREATMENT.—*Externally:* As soon as breathing is established let the patient be stripped of all wet clothing, wrapped in blankets only, put to bed comfortably warm, but with a free circulation of fresh air, and left to perfect rest. *Internally:* Give whisky or brandy and hot water in doses of a teaspoonful to a tablespoonful,

†A child or very delicate patient must, of course, be more gently handled.

according to the weight of the patient, or other stimulant at hand, every ten or fifteen minutes for the first hour, and as often thereafter as may seem expedient. *Later manifestations:* After reaction is fully established, there is great danger of congestion of the lungs, and if perfect rest is not maintained for at least forty-eight hours it sometimes occurs that the patient is seized with great difficulty of breathing, and death is liable to follow unless immediate relief is afforded. In such cases apply a large mustard plaster over the breast. If the patient gasps for breath before the mustard takes effect assist the breathing by carefully repeating the artificial respiration.

MODIFICATION OF RULE III.

(To be used after Rules I and II in case no assistance is at hand.)

To produce respiration.—If no assistance is at hand, and one person must work alone, place the patient on his back with the

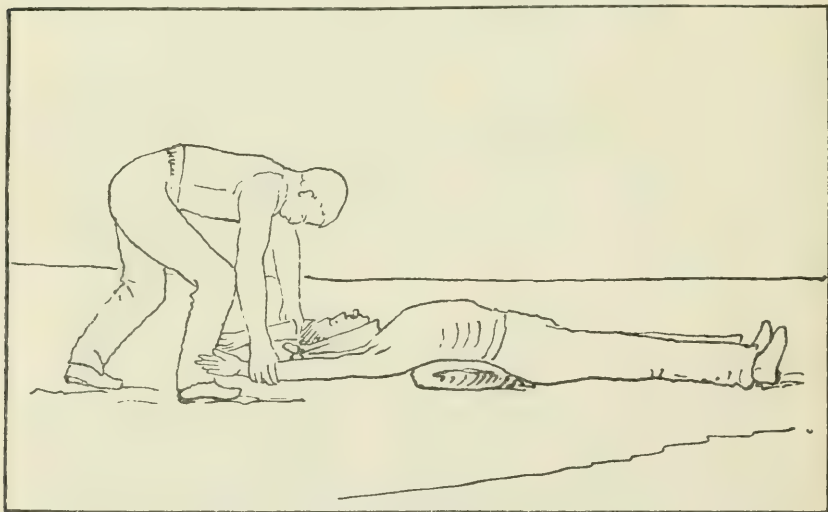


Fig. 5

shoulders slightly raised on a folded article of clothing; draw forward the tongue and keep it projecting just beyond the lips; if the lower jaw be lifted the teeth may be made to hold the tongue in place; it may be necessary to retain the tongue by passing a handkerchief under the chin and tying it over the head.

Grasp the arms just below the elbows and draw them steadily upward by the sides of the patient's head to the ground, the hands nearly meeting. (See fig. 5.)

Next lower the arms to the sides and press firmly downward and inward on the sides and front of the chest over the lower ribs, drawing toward the patient's head. (See fig. 6).

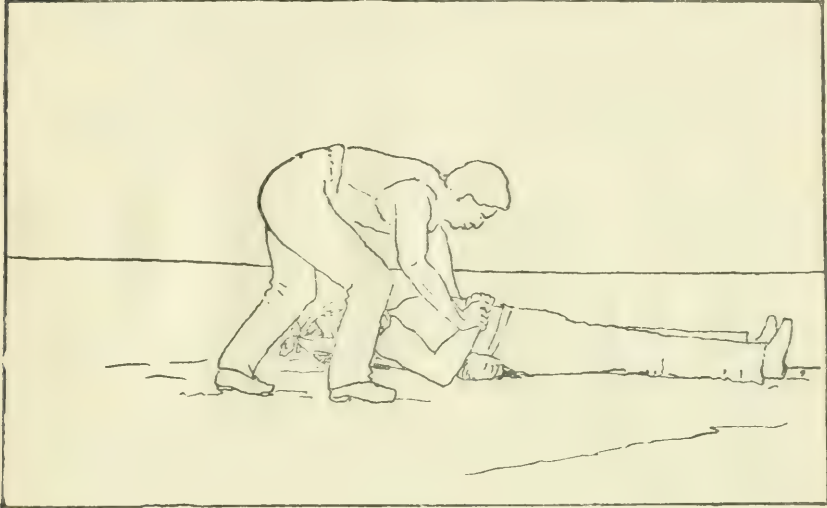


Fig. 6

Repeat these movements twelve to fifteen times every minute, etc.

Instructions for saving drowning persons by swimming to their relief

When you approach a person drowning in the water assure him, with a loud and firm voice, that he is safe.

Before jumping in to save him, divest yourself as far and as quickly as possible of all clothes; tear them off if necessary; but if there is not time, loose at all events the foot of your drawers, if they are tied, as, if you do not do so, they fill with water and drag you.

On swimming to a person in the sea, if he be struggling do not seize him then, but keep off for a few seconds till he gets quiet, for it is sheer madness to take hold of a man when he is struggling in the water, and if you do you run a great risk.

Then get close to him and take fast hold of the hair of his head, turn him as quickly as possible onto his back, give him a sudden pull, and this will cause him to float, then throw yourself on your back also and swim for the shore, both hands having hold of his hair, you on your back and he also on his, and of course his back to your stomach. In this way you will get sooner and safer ashore than by any other means, and you can easily thus swim with two or three persons; the

writer has even, as an experiment, done it with four, and gone with them 40 or 50 yards in the sea. One great advantage of this method is that it enables you to keep your head up and also to hold the person's head up you are trying to save. It is of primary importance that you take fast hold of the hair and throw both the person and yourself on your backs. After many experiments, it is usually found preferable to all other methods. You can in this manner float nearly as long as you please, or until a boat or other help can be obtained.

It is believed there is no such thing as a *death grasp*; at least it is very unusual to witness it. As soon as a drowning man begins to get feeble and to lose recollection, he gradually slackens his hold until he quits altogether. No apprehension need, therefore, be felt on that head when attempting to rescue a drowning person.

After a person has sunk to the bottom, if the water be smooth the exact position where the body lies may be known by the air bubbles which will occasionally rise to the surface, allowance being of course made for the motion of the water, if in a tideway or stream, which will have carried the bubbles out of a perpendicular course in rising to the surface. Oftentimes a body may be regained from the bottom, before too late for recovery, by diving for it in the direction indicated by these bubbles.

On rescuing a person by diving to the bottom, the hair of the head should be seized by one hand only, and the other used in conjunction with the feet in raising yourself and the drowning person to the surface.

If in the sea, it may sometimes be a great error to try to get to land. If there be a strong 'outsetting' tide, and you are swimming either by yourself or having hold of a person who can not swim, then get on your back and float till help comes. Many a man exhausts himself by stemming the billows for the shore on a back-going tide, and sinks in the effort, when, if he had floated, a boat or other aid might have been obtained.

These instructions apply alike to all circumstances, whether as regards the roughest sea or smooth water.

Treatment of Frostbites

(As recommended by the Surgeon-General of Public Health and Marine Hospital Service of the U. S.)

Do not bring the patient to the fire, nor bathe the parts in warm water.

If snow be on the ground, or accessible, take a woollen cloth in the hand, place a handful of snow upon it, and gently rub the frozen part until the natural colour is restored. In case snow is not at hand, bathe the part gently with a woollen cloth in the coldest *fresh* water obtainable—ice water if practicable.

In case the frostbite is old, and the skin is turned black or begun to scale off, do not attempt to restore its vitality by friction, but apply carron oil on a little cotton; after which wrap the part loosely in flannel.

In all cases, as soon as the vitality has been restored, apply the carron oil, prepared according to Service formula.* As it contains opium, do not administer morphia or other opiate.

In the case of a person apparently dead from exposure to cold, friction should be applied to the body and the lower extremities, and artificial respiration practised as in cases of the apparently drowned. As soon as the circulation appears to be restored, administer spirits and water at intervals of fifteen or twenty minutes until the flesh feels natural. Even if no signs of life appear, friction should be kept up for a long period, as instances are on record of recovery after several hours of suspended animation.

On the restoration of life, a teaspoonful of warm water may be given; and then if the power of swallowing has returned, very small quantities of wine, warm brandy and water, beef-tea, or coffee administered, the patient kept in bed, and a disposition to sleep encouraged.

Watch the patient carefully for some time to see that breathing does not fail.

If the patient has been carried to the house, be careful to let the air circulate freely about the room, and prevent crowding round the patient.

*The Service formula for *carron oil* is to mix 12 parts olive oil, or raw linseed oil, with 12 parts of limewater, and 1 part tincture of opium.

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Left Belleville 9 40

Arrived Trenton 11 40

Went to W.

Left Trenton 12 00

Arrived Frankford 2 40

Reached Walmore's Camp 5 30

Left Camp 7 A.M.

Arrived Richardson's 8 40

Left 11 45

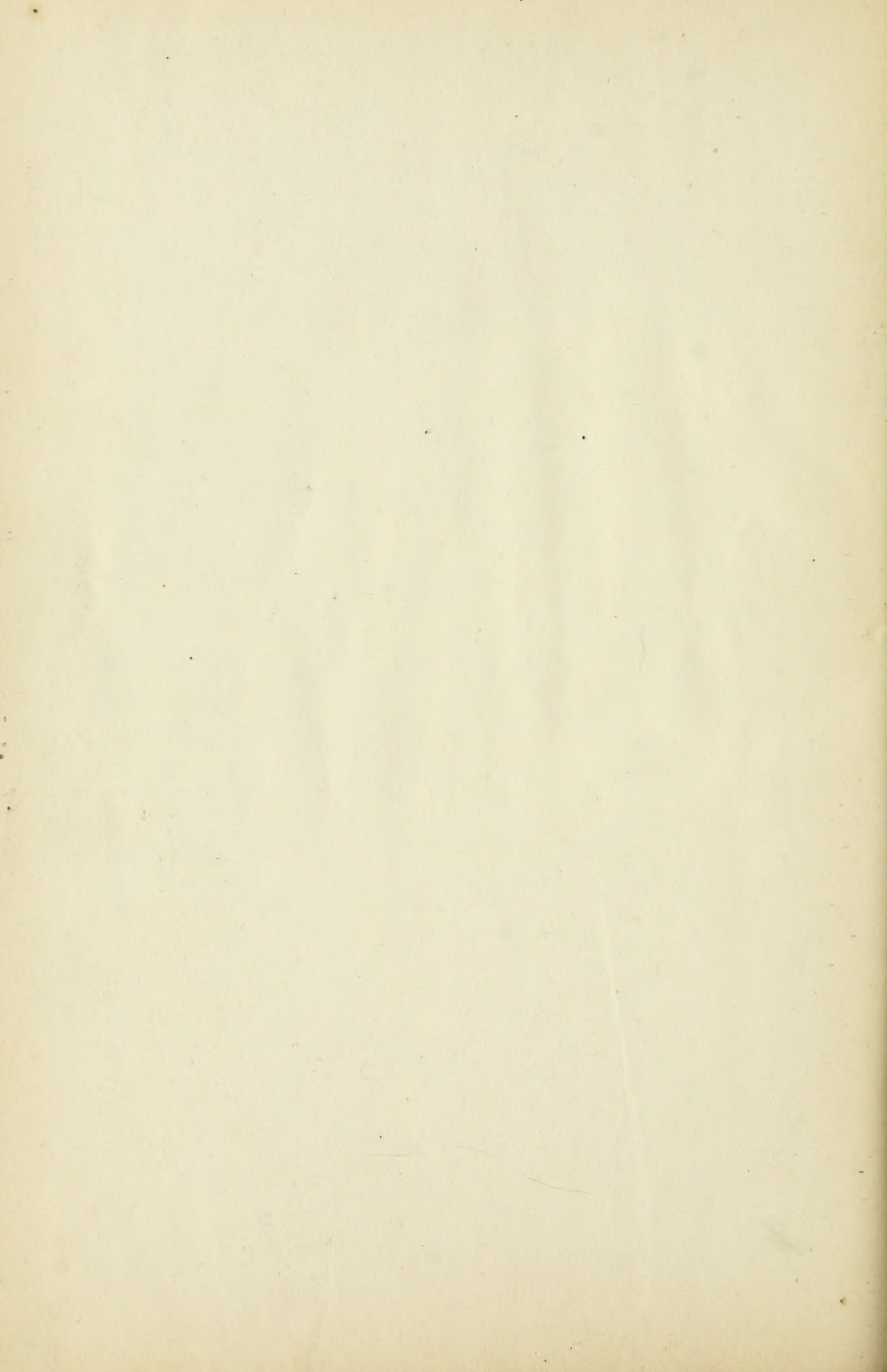
Reached Frankford 12 A.M.

Arrived Trenton 2 40

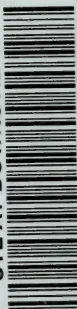
Left 4 30 W and C. train

Arrived 6 20





UTL AT DOWNSVIEW



D RANGE BAY SHLF POS ITEM C
39 12 20 25 07 017 5